JULY, 1938
Vol. II. No. 14

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Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

■ *Synthetic Resins* ■ *Casein* ■ *Rubber* ■ *Cellulose Compositions* ■

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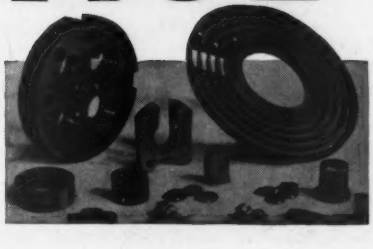

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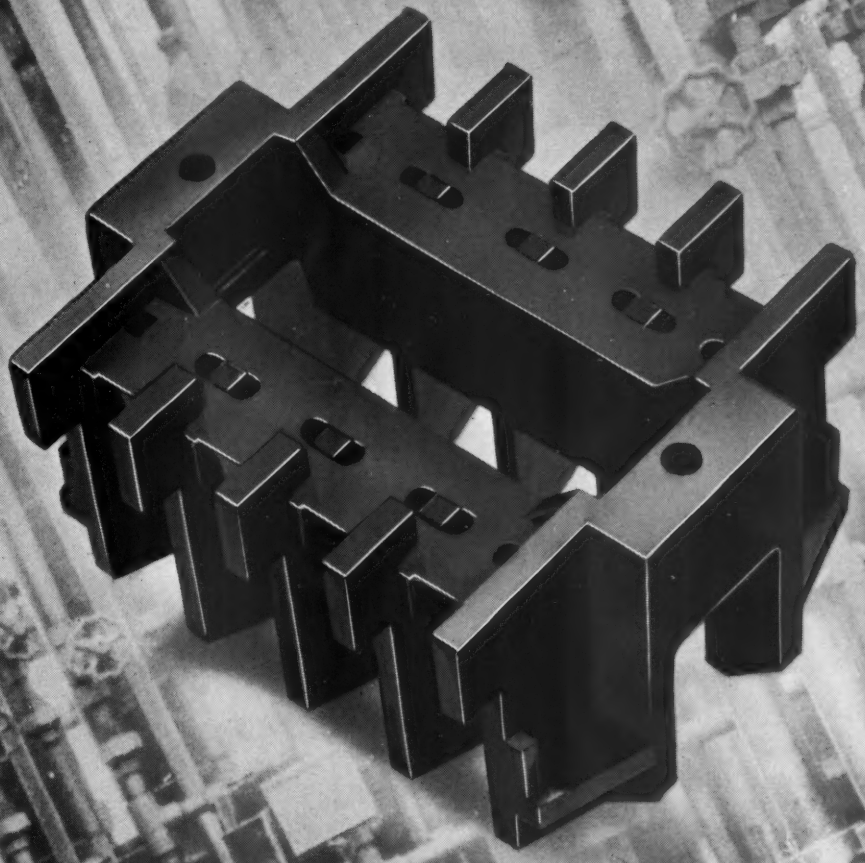

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BX

4. THROUGH LIFE WITH BX PLASTICS

It's quite surprising, as you walk round Peter and Prudence's new house (or any other young people's house for the matter of that), to find how many things are made of B.X. Plastics.

Inside the front door, as you hang up your coat, you notice the family umbrellas with Lactoid handles. The lounge is softly and pleasantly lit by several table lamps. The shades are Bexoid (safety celluloid), and Prudence will tell you that they look as attractive by night as by day.

1 Lampshades and umbrella handles.

Uncle Gilbert's wedding present was a piano—with Xylonite keys. Uncle Gilbert (bless his late-Victorian heart!) believes that "a piano in the parlour gives the house a tone," and, as he's made Peter his heir, the young Peabodys hadn't the heart to point out that a piano takes up a lot of useful space and they really much prefer their radio-gram with its undistortable illuminated tuning dial of Special Purpose Bexoid! It is playing gently as you sit down to dinner in the alcove, at the softly lighted table where Xylonite-handled knives and Xylonite napkin rings glow against the grained woodwork, the glass and the gay dishes.

2 Piano keyboard.

Upstairs in the Peter Peabody's house it is still plastics, plastics, all the way. The bathroom department shows many things in Xylonite and Bexoid—covered seats, covered towel rails, nail brush backs and tooth brushes, and even the thermometer mount. In the bedrooms, pin trays, bell pushes, button hooks, door plates and drawer handles carry on the scheme, while, when you go down again to see the kitchen, Prudence will show you those odourless celluloid covers for jampots and milk bottles which mean so much in a town housewife's battle against dust and insects.

3 Bell pushes, thermometer and manicure stand.

★ *NEXT MONTH: PLASTICS IN PEABODY SPORTS AND PASTIMES*

In every home you will find a B.X. Plastic—even though it is only the eyelet covering on a shoe! The British Xylonite Company, Limited, makes three famous Thermo-Plastic raw materials—Xylonite (Celluloid), Bexoid (Safety Celluloid) and Lactoid (Casein). From these materials other firms throughout the country manufacture an enormous range of everyday goods which are not only useful, but durable and beautiful.

Full information on any branch of Plastic production may be had from the Company's Head Office, Hale End, London, E.4.

THE BRITISH XYLONITE COMPANY LIMITED

MAKERS AND MANIPULATORS OF PLASTICS

HALE END, LONDON, E.4, and BRANTHAM

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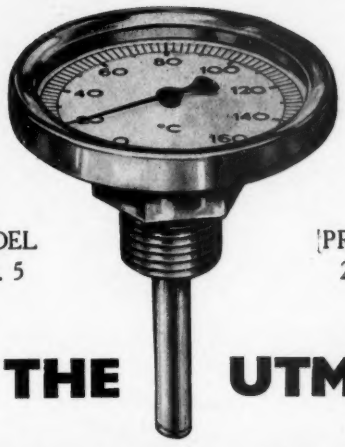

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Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials.

Vol. II. JULY, 1938 No. 14

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TEMPLE PRESS LIMITED
Proprietors, Printers and Publishers of "The Motor," "The Light Car," "The Commercial Motor," "Motor Cycling," "Cycling," "The Motor Ship," "The Motor Boat," "The Oil Engine" "The Aeroplane," "Light Metals," and "Chain & Multiple Store."

5-17, Rosebery Avenue, London, E.C.1
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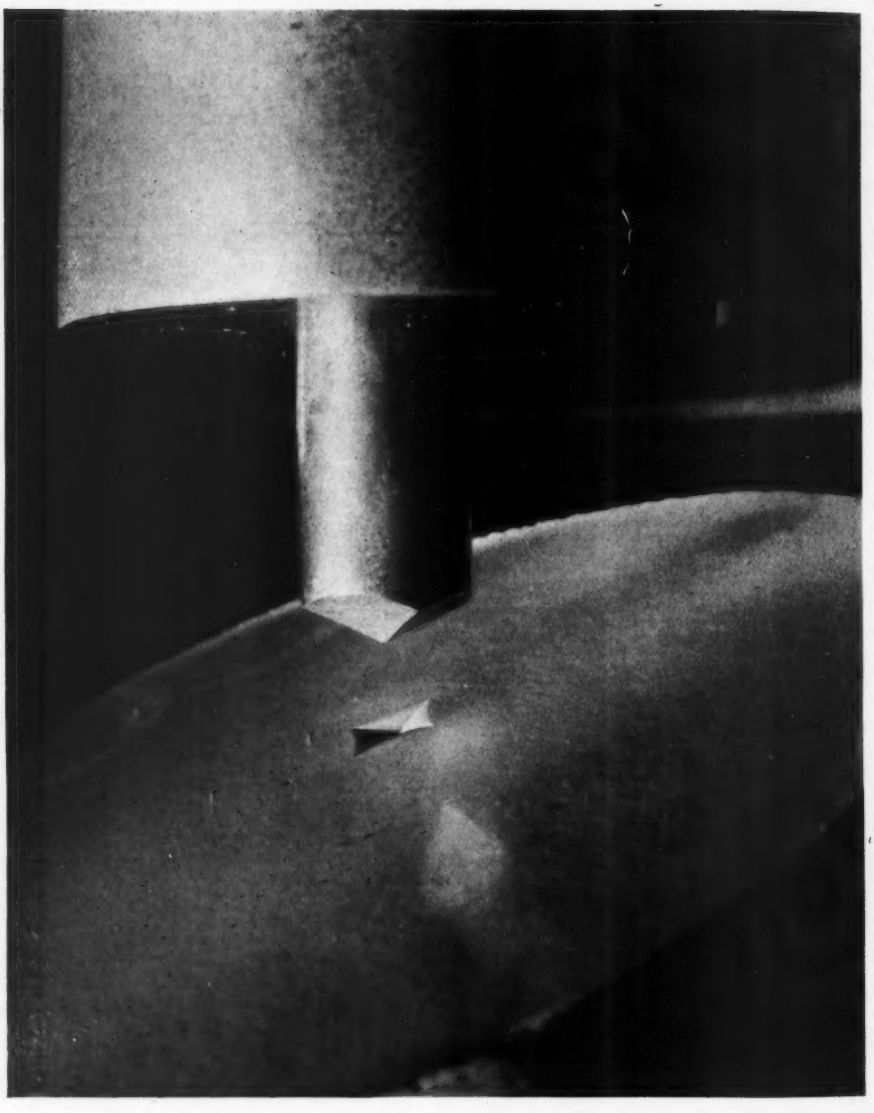

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M.11

Vol. II. No. 14 JULY, 1938

Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

Proprietors - - TEMPLE PRESS LIMITED
Managing Director - ROLAND E. DANGERFIELD

Editor - - M. D. CURWEN, B.Sc., A.I.C.
Offices - 5-17, Rosebery Avenue, London, E.C.1

Resin-impregnated Wood for Railway Coaches?

AFTER every railway accident in this country it is usual to discuss the problem of steel versus wooden coaches. In America, steel coaches are general; in this country wooden ones, especially the older type, are the rule. Since some success with steel coaches has been obtained in the United States of America the question has become a hardy perennial here.

The Castlecary accident has again re-opened it, and a recent issue of the *Daily Telegraph* contains a reasoned and balanced article by Mr. Kenneth Cantlie on the subject. According to this writer there are apparently two schools of thought: one that considers it essential to have a rigid non-shattering (steel) type of coach, and the other that believes the telescoping of wooden carriages in a collision is, in certain circumstances, an actual blessing. The telescoping of the front carriages, it is claimed, allows the remainder of the train to come to a stop without shattering, while a non-telescoping or rigid train would fling all passengers from their seats, injuring or killing them.

Mr. Cantlie makes several interesting suggestions, but completes his notes with the following statement:—"Whatever the merits of all-steel coaches, however, their immediate introduction on a large scale is impracticable in this country. Not only would the cost of replacing wood by steel coaches in any short term of years impose a great burden on the railways' revenue, but there are additional weighty objections, such as the disturbance of the labour market by the dismissal of railway carpenters, and their replacement by platers, steel pressers, welders and riveters, at a time when such classes of labour are in great demand for armaments. The delay in installing suitable manufacturing and repair machinery would also, for the same reason, be considerable, and the diversion of labour would be unjustifiable."

It seems appropriate, then, to consider another choice of material of construction, which, to us at least, seems not wholly outside the bounds of possibility. We refer to resin-impregnated wood—wood either impregnated in bulk by pressure or vacuum with a solution or emulsion of resin, or what is now being used in fair quantity in the aircraft industry, a construction of laminations of wood so treated.

Here we have a material which, for the purpose in view, would be between steel and untreated wood in many characteristics. Less rigid than steel, yet stronger than wood, it would possess a resilience that may be exceedingly desirable. Certainly it would resist impact to a much greater extent than wood does, and dangerous splintering would be less likely to occur.

It is true that wood impregnated with resin is more costly than untreated wood, but there would be no disturbance in the labour market in its use such as would occur if steel were employed.

We maintain that the outstanding physical properties of resin-impregnated wood merit its early consideration by railway authorities as a really safe constructional material in place of the ordinary untreated wood. It is to be hoped that the stigma "conservatism," as applied to British railways, will, in this case, prove unjustified, and that they will at least carry out some impartial tests for themselves. We can give an assurance that the plastics industry will be found ready and, indeed, anxious to co-operate as fully as possible with railway experts.

Safety Glass and Modern Transport

SOME months ago we saw the results of an accident on the Finchley Road—a motor omnibus with almost every window shattered and on the pavement a sight almost as gory as any modern scene, let us say, in Barcelona. Most passengers on board appeared to have been hurt, fortunately not seriously, by flying splinters of glass. It is interesting to note that comments from passers-by had reference to the rarity of accidents by motorbuses rather than to the accident itself. The admirable road conduct of their drivers is very noteworthy.

Now, since about every one in twenty are private car owners (there are about 1,900,000 cars in the country), we know to our cost and increased safety that under the Road Traffic Act a Statutory Rule and Order was made

and came into force on May 31, 1937. It ordered that the glass windscreens and windows facing to the front on the outside of any motor vehicle, except glass fitted to the upper deck of a double-decked vehicle, must be of safety glass. For the purpose of this Regulation, any windscreen or window at the front of the vehicle, the inner surface of which is at an angle exceeding 30 degrees to the longitudinal axis of the vehicle, shall be deemed to face the front.

Many private owners had long utilized safety glass both for windscreens and side windows, and, in spite of the higher cost, the provisions of the Order were adhered to with sufficiently good grace. In any case, too much was at stake, as the number of casualties showed. We are convinced, too, that the seriousness of most accidents has diminished.

But does the Order go far enough? Why should side windows not be also of safety glass? The whole Order seems to have been compiled with the object of meeting interested parties half way, because safety glass is more expensive than ordinary glass. It seems strange that in France all windows, front and side, seem to be plastered with the word "Securit," while this country should be lax. Do they always order things better in France?

We must admit two things immediately. First, that omnibus drivers, especially those so admirably trained by the L.P.T.B., are extremely capable and accidents are comparatively negligible. Secondly, that front windows are more liable to blows than the side windows. If, however, an accident by collision does occur between a bus and another object, we venture to say that, in view of the rigid construction of side windows, severe strain is placed on the glass and breakage is easily possible.

What seems strange is that the top front windows on a double-decker should not be considered sufficiently important to be made of safety glass. It would seem that authorities consider that the only danger is from flying stones and the like. The accident we saw indicates other dangers.

Cost is, of course, a deterrent to widespread use of safety glass, for since it consists of a sandwich of two sheets of glass with a sheet of celluloid or similar plastic material between, its accurate manufacture is not simple. Where the safety of the public is concerned, however, there cannot be two opinions regarding the ideal to be aimed at.

It is certain that in the absence of an entirely plastic window the Triplex or other "sandwich" type is extremely safe. Nevertheless, we do not give up hope for the window that contains no glass at all. The tough, unbreakable "acrylic" resin window, as typified by the British material Perspex, would be far more acceptable. It is true that its surface is not as hard as glass, but when travelling from Glasgow on the Coronation Express recently we spent an hour in the observation car. As our readers will remember from reference in our September, 1937, issue, the observation car in the rear is fitted with this material. During the journey we examined it carefully. It is still as clear as the day it was fixed and free from scratches. Undoubtedly, more care was taken in its cleaning than when dealing with glass, but we look forward to the time when this or even improved types are available to the travelling public.

From the Four Corners

Lucite for Jewellery

Crystal-gazer lockets of Lucite methyl methacrylate resin are being shown in many costume jewellery variations, combined with gold trim for bracelets and pins, or used as pendants. Leather and silver trim are also available. These plastic lockets, which can be opened to change the photographs, are manufactured by Cohn and Rosenberger, New York City.

Severe Tests for Proxylin-coated Fabrics

Recent tests with "Fabrikoid," the well-known Du Pont brand of proxylin-coated fabric, revealed that it can withstand 1,000,000 flexings that simulated the continual stress of a 200-lb. man sitting down on the cushion of a chair upholstered with this material. Another gruelling test given to a piece of furniture covered with "Fabrikoid" shows its remarkable resistance to hard wear. The chair withstood public use at the Chicago World's Fair, was washed and sent to Dallas, served there for a year, was washed again and sent to San Diego. Latest reports are that the material is still in good enough shape for more use.

Laminated Sheets for School Desks

Soviet industries are finding many new applications for plastics, and certainly one of the most recent and interesting of these is the use of laminated sheets for covering schoolroom desks. It is claimed that these possess excellent wearing properties, and Russian doctors state that the phenol-formaldehyde impregnated surface is definitely hygienic, and therefore the new desks should contribute to the healthfulness of the children.

Milk Bottles

About a year ago there was published information that Germany was producing the plastic milk bottle. This was not part of the four-year plan, since glass is as plentiful there as anywhere else, but an effort to introduce greater hygiene into this important industry.

The development is certainly interesting, but without displaying undue pessimism there has been little or no diminution in the use of glass bottles in this country. An attempt has been made to introduce paper or cardboard containers waxed inside to prevent leakage and closed with a metallic fastener at the top. Such milk bottles are available, but at present they are not widely employed, in spite of the fact that at first sight there are advantages not only from the hygiene point of view, but also because "returns" and bottle washing by the milk filling stations is a great economic problem.

The most recent news from Germany is that plastic milk bottles can be turned out at one shilling per dozen! It remains to be seen whether, even at this extraordinarily low price, such bottles will find their way to the public. To us it seems that, especially for distribution to schoolchildren, glass bottles, because of the difficulty of producing a hygienically closed lid, must receive condemnation.

COOL BREEZES IN WEST AFRICA

An Important Tropical Problem Solved with the Aid of Laminated Plastics

ONE day last month we wandered round the basement of the London School of Hygiene and Tropical Medicine and entered a room. Coming from the cool corridors without, it was as if we were pushing against a curtain of air so hot that it might have come straight from Singapore or Tophet, so moist that we might have been in the sudatorium (polite for sweat-room) of a Turkish bath. It was a special chamber maintained for experimental purposes at a temperature and a humidity which reproduced those of West Africa—not in the cool season.

The temperature was exceedingly high, but what made the room thoroughly uncomfortable and exhausting was the high moisture content of the air. The following figures show the conditions therein:—

Dry bulb	...	...	100° F.
Wet bulb	...	...	90° F.
Dew point	...	...	87.5° F.
Relative humidity	...		69%

But within this room there was another totally enclosed cubicle, and into this we stumbled for relief and comfort from the outside. Here the conditions were cool and of comparatively low relative humidity, and, indeed, gave the impression that once again we were out in the cool corridors of the school.

Here the figures were:—

Dry bulb	...	...	85° F.
Wet bulb	...	...	72.5° F.
Dew point	...	...	67.5° F.
Relative humidity	...		55%

The idea of the cubicle was suggested by Dr. G. P. Crowden, Reader in Industrial Physiology at London University, who has long made this type of work his immediate study. It has now been turned to practical use by Newcon Industries, Ltd., City Gate House, Finsbury Square, London, E.C., who have constructed the cubicle.

Of outstanding importance is the fact that it is portable and air-conditioned by a system which employs a motor of only ½ h.p., the consumption of electricity being only that of a small fire, so that it can be simply and cheaply run. This plant removes air through one vent in the cubicle wall and forces dry and cool air in through another vent.

This final form of cubicle, which has been arrived at by long experiment by Dr. Crowden, comprises 21 separate panels each weighing about 27 lb., and the whole capable of being fitted and clipped together very rapidly and easily.

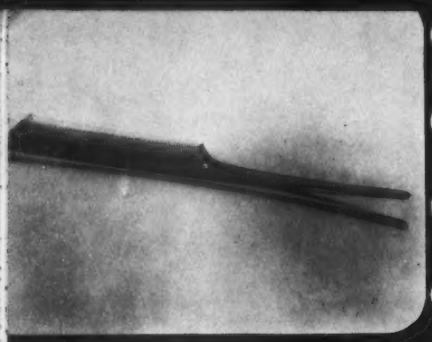
The secret of the excellent results obtained lies in the structure of the panelling. It consists of three sheets, the two outer ones being of Bakelite laminated material and the inner one of reinforced aluminium foil. There are thus two air spaces between. Transfer of heat through the Bakelite and through air is small, but the greatest insulating effect is due to the polished aluminium, which reflects back heat waves very effectively.

Bakelite laminated panels were chosen for the excellent manner they agree with the requirements for rigid, polished and tough sheets able to withstand long-distance travel under bad conditions. Moreover, since the new cubicle will find plenty of scope in the tropics, the fact that Bakelite is proof against ants and other insects and is not subject to rot, is an added attraction.

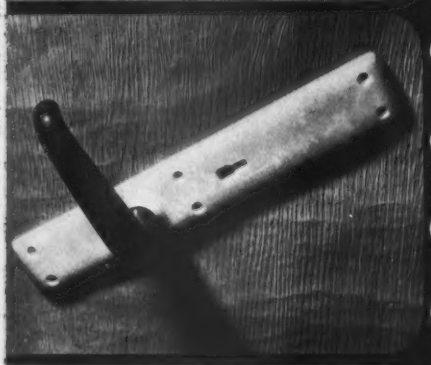
We understand that several shipping firms are interested in this new development for installation on tropical routes for invalids. There is also a proposal to use these cubicles at the bottom of deep mines such as exist on the Rand goldfields for the treatment of heat-stroke cases. In the tropics their use for many general purposes, such as rest rooms in houses, barracks and factories, is obviously indicated.

"General Release"—I

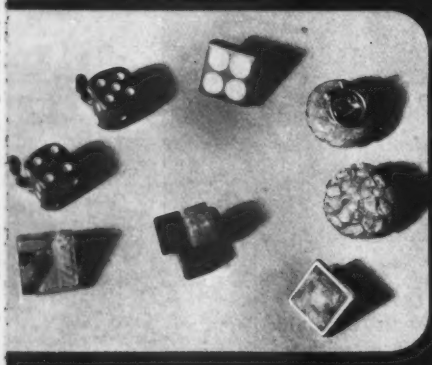
New and Interesting Plastic Goods



THIS Xylonite comb shows a return to the old-fashioned "tail comb," now found useful for the small curls used in modern hairdressing. It is made by British Xylonite Co., Ltd., and is available in tortoise-shell, ivory white, black, transparent or green.

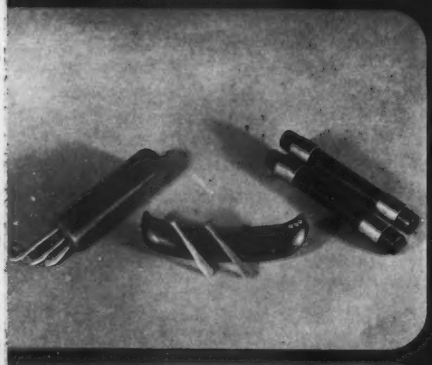


MADE for strong wear, and yet elegantly designed, this Evered "Kleanline" moulded spring-loaded lock set in Onyx and black, with hook lever, immediately attracts the eye. The material is shock-resisting amino resin specially made to stand up to hard wear without chipping.

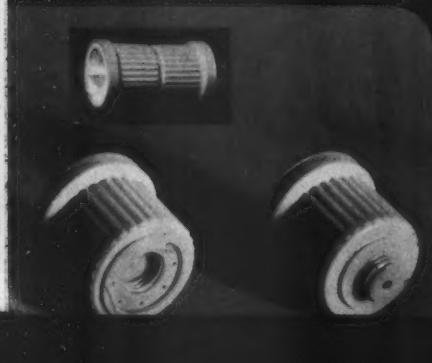


FOR evening wear these unusual and yet chic earrings command immediate admiration, and even envy. They are made of Catalin, and some of them are hand-carved. A famous Parisian artist was responsible for the designs.

MOULDED of Beetle by British Industrial Plastics, this hygienic denture bath fulfils all practical requirements. The advice given on the carton containing the bath is particularly appropriate: "Don't put your false teeth in a glass tumbler at night, it looks unsightly. Use a Beetleware denture bath."



MISS 1938 certainly has no handicap when she wears these smart brooches made of Catalin. They are at present all the vogue in Paris.



INGENUITY and modernity are happily combined in the design of this joint pepper and salt container specially made for picnic use. It is made of Beetle moulding powder by the Streetly Manufacturing Co., Ltd. The set is obtainable at the large multiple stores and is enjoying a good sale—hikers and motorists please note.

"General Release"—II

New and Interesting Plastic Goods

SIMPLICITY is the keynote of this attractive Bex tea-time set, which is moulded by British Xylonite, Ltd., and available in a number of bright colours. The display carton used for packing the set is smart and designed to attract attention.

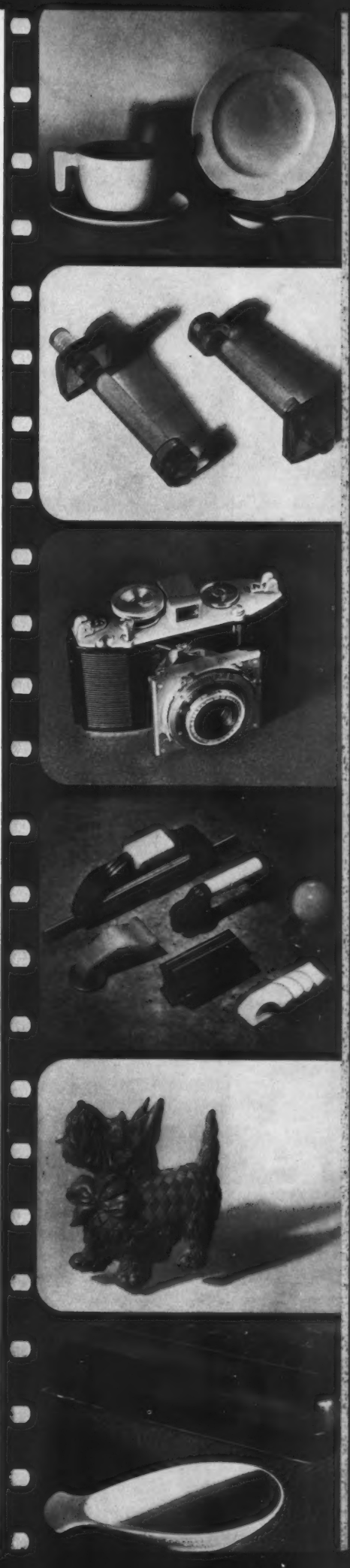
TRANSPARENT celluloid nuts and bolts find several important uses in the chemical and allied industries. The General Celluloid Co., Ltd., of Hounslow, Middlesex, are the manufacturers of the examples illustrated, and they point out that the bolts are made out of one piece of celluloid.

THIS is the latest model of the popular Karat camera, made by Agfa, Ltd. The body is moulded of a special shock-resisting phenolic resin, and it is exceptionally sturdy and well able to take plenty of hard knocks. In design and operation this miniature camera ranks as one of the most popular models of 1938.

THESE excellent examples of Catalin door furniture are now finding many uses in new houses, shops and hotels. There is no denying that where bright colours, lustrous surfaces and transparency are combined, then popularity is assured, provided, of course, that the workmanship and design leave nothing to be desired.

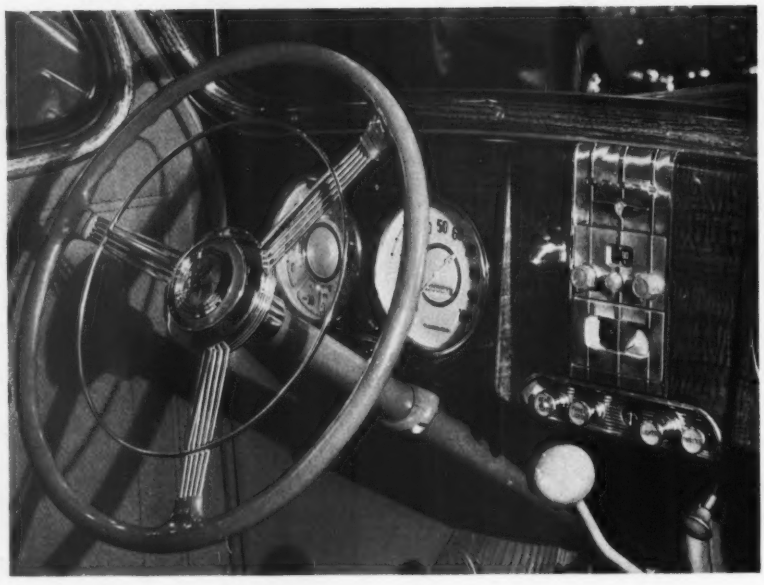
SCOTTIE brooches and dress ornaments are now very popular, and this one moulded of Bexoid is a good example of the type in constant demand at the large chain stores.

EXACT doses of thick codliver oil preparations are now possible with this moulded measure which holds one teaspoonful at the lower calibration and one dessertspoonful at the higher mark. The Streetly Manufacturing Co., Ltd., are the moulders and the material is white Beetle.



STEERING WHEEL PRODUCTION for AMERICAN CARS

Some Notes of Interest to British Car Manufacturers



De luxe wheel as installed in an American passenger car. The plated hub and horn rim are zinc die castings and the rim is moulded from cellulose acetate over a steel core. The rim and hub match various parts on the instrument panel, some of which are die cast and some moulded.

Screwing stainless steel spokes into the die-cast hub of a Chevrolet steering wheel, the hub being held on a fixture and the spoke driven by a special chuck in a drill press.

Six different designs of die-cast zinc-alloy steering wheel hubs used on American cars.

STRENUOUS efforts to improve the appearance of American motorcars have borne rich fruit for their manufacturers and have had much to do with the increased sale of various makes. Having learned this through experience over a period of several years, the important producers retain the services of designers or "stylists" whose sole job is centred around the refinement of design as affecting appearance. This applies not alone to exterior lines and fittings, but to interiors as well, feminine appeal being stressed in certain respects because of its importance as affecting sales.

Instrument panels and steering wheels have become focal points of interior styling. Added cost, though rarely excessive, is given careful consideration, but is not objected to in certain items as it has been found that many purchasers willingly pay a premium of one or two pounds for such items as a handsome plastic-rimmed steering wheel. Such a wheel costs much less than this sum, but is noticeably superior to the common rubber-rimmed type in appearance. Some 20 per cent. of General Motors cars were equipped with these de luxe extra-priced steering wheels last year and each year shows a larger percentage on nearly all makes offering them. One plant alone is equipped to make about 3,000 of these wheels a day.

Four kinds of material enter into the manufacture: die castings, plastics, stainless steel and ordinary carbon steel. Hubs and horn rings are the most important die castings used, but some wheels have spoke spacers of this type. High-purity Zamak zinc alloy (called "Mazak" and produced by National Alloys, Ltd., in England) is employed for these castings because it is low in cost, tough, easily formed into the somewhat complex shapes required, is easily plated or enamelled and is non-rusting.

Specialists in die casting produce the castings, usually with shaft and spoke holes cored, and sometimes do such light machine operations as tapping spoke holes. Often they do such plating as may be specified. This leaves only assembly operations to be performed by

the steering-wheel manufacturer so far as the die castings are concerned. Some makes of hub are cast with steel inserts to which the inner ends of the spokes are welded, but in other cases the spokes are screwed into tapped holes or pressed into unthreaded holes, in the latter case being held by a steel ring dropped into notches made for the purpose near the inner ends of the spokes. One company reports that its die-cast hubs are lighter and nearly twice as strong in torsion as were the malleable iron hubs formerly used, besides being smoother in finish and non-rusting.

Some wheels are still equipped with horn buttons, usually moulded from plastic to match the rim, but many now have light horn rings so placed that the horn is sounded by pressing the ring with one thumb and without removing the hand from the rim. Such rings are die cast with three integral spokes which support the ring and are adapted at the centre to actuate contacts for sounding the horn.

Rims for the steering wheel itself are moulded from plastics for several reasons: the material used (cellulose acetate) comes in numerous and highly attractive translucent colours, usually matching knobs and other trim on the instrument panel, and makes a smart contrast with bright metal parts of the wheel. In addition, the plastic, being a poor conductor of heat, is pleasant to the touch and has a relatively warm feel, even in cold weather. Moreover, the plastic is readily moulded with finger grooves. Finally, and quite important, it requires no applied finish, does not wear off or soil gloves or hands, is not easily chipped or broken and retains its fine appearance indefinitely.

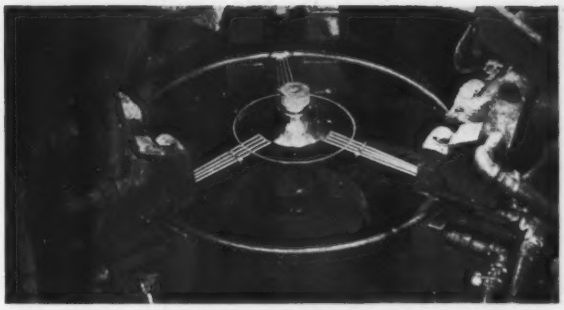
Moulding of the plastic is done over a steel ring or core which adds strength and provides a strong anchor for the outer ends of the spokes. The latter are made from polished stainless steel because it is non-rusting, requires no plating, has high strength and provides sufficient resilience to prevent road vibrations from being uncomfortable when the wheel is gripped.

In the plant of the Inland Manufacturing Division of the General Motors Corporation, located in Dayton, Ohio, which produces steering wheels for all General Motors and some other makes of cars, manufacture of the de luxe wheel proceeds as follows:—

Die-cast hubs and other die-cast parts are received from outside sources, many of them plated and ready for assembly and all with holes for spokes made ready for spoke insertion. In the Chevrolet wheel a decorative die-cast ring through which the spokes pass is used to encircle the hub and act as a spoke spacer, although additional spacers are also provided. Spokes are received with rolled threads on inner ends and these are threaded through the ring and into tapped holes in the hub, being turned into the latter by a special chuck in a drill press, as illustrated. Other spacers are slipped over the spokes and are subsequently struck in a press, forcing some of the metal into notches cut in the spokes. This anchors the spacers firmly and avoids any chatter or "singing" of spokes in service.

Hubs which have been plated require no attention before receiving their complements of spokes, but those which are to be enamelled have this finish applied by spraying and are then baked to harden the enamel and make it more enduring. Spokes are received ready polished and with rolled threads which are slightly larger in diameter than the spoke and provide a fastening as strong as the body of the spoke when screwed into place. Rings forming the rim core are rolled up from rod or wire which is first pressed flat where the spokes come and is drilled at these points for the spokes to pass through. The joint in the ring is welded, but the spokes are not welded to the rim as the heat of such welding would be likely to discolour the spokes. Instead, the spokes are silver-soldered to the rim, this work being done in a special machine with electrodes for resistance heating at the joint.

Before this soldering, a flux is applied at the joint and a short strip of solder is placed at each point where the soldering is to be done. Electrodes are then closed and heat, applied by the current passed through them and the rim, causes the solder to flow and make the required joints. Immediately after this occurs, the electrodes are opened and jets of water are played on



In this machine the ends of the spokes are silver-soldered to the steel rim core while the assembly is held in electrode jaws which apply the heat for fluxing the solder.

Preforms of cellulose acetate moulding granules are made in the die shown in this press, some of those previously ejected being seen in the foreground.

Moulder removing from the press a steering wheel over the spider of which a cellulose acetate rim has been moulded. Assembled spiders are heated in the oven at back of the operator before being placed in the mould as inserts.

Polishing the inner faces of a moulded rim. The small conical buffing wheel makes it possible to get into the small radii.

Ashing and polishing operations are done on soft muslin wheels against which the rim is guided by hand.

the spokes and joint to prevent any heat discoloration beyond the point where the joints are subsequently covered by the plastic, which the wheel is now ready to receive.

Although the moulding of the rim is not especially difficult as moulding operations go, care is required to make sure that the plastic is properly distributed, leaving the core at the centre. To assure this, the plastic is first prepared in preforming operations which are more or less equivalent to an initial moulding, the work being done in a special mould which heats the plastic enough to cause the granules of cellulose acetate to knit but not to flow together as completely as in the subsequent moulding. In the mould, there is first placed a loose steel ring recessed to form one side of the ring. When thus formed, the steel ring is ejected with the preform so that there is no chance of the latter being broken by the ejector pins. The preform is recessed on the side designed to fit against the steel core and is made convex on the other side so that a minimum of flow is required in moulding it subsequently around the core. Two preforms are required, of course, to form the complete ring.

Final moulding of the rim over the core is done in heavy presses fitted with moulds so made as to give the rim the shape desired, the total pressure being such that a final pressure of about 1,300 lb. per sq. in. is applied to the plastic. The first operation is to put a preform in the mould, making sure that it is not broken and rests properly in the cavity. A completed spider, prepared in the process already outlined and heated in an oven which brings it to about mould temperature, is then set in place on top of the first preform. A second preform is then placed over the insert and a low pressure is applied.

During these operations the mould is being heated, and as soon as the plastic is sufficiently warmed to flow easily the mould, which is of the flash type, is fully closed under pressure from a 1,500-lb. per sq. in. hydraulic line, pressing the plastic into the required shape. As soon as this takes place, the steam is shut off and water is admitted to the mould channels in its place, thereby cooling the mould and hardening the acetate enough to permit of removal without distortion. In the moulding, some of the plastic flows down a part of the length of the spokes besides covering the rim itself and its joints with the spokes. Flash forced out is cut away and is reused along with new material in subsequent preforms except in the case of very light tints in which any particles of dust collected might show.

Since cellulose acetate is rather expensive, especially in the light tints often used for steering wheels, all possible waste is avoided. In a thermo-plastic of this kind, however, the material can be reworked so that very little net waste is encountered.

Wheels coming from the moulds have a good finish, but flash lines show, of course, and must be removed. This is accomplished partly with hand tools and partly by sanding and buffing on suitable wheels, as shown in accompanying illustrations. In some of this work the wheels are mounted on "spinners" driven by friction and with the motion controlled at will by the operator. After sanding, some of which is done by hand and some by power, the rim of the wheel is "ashed" with wet pumice on a soft wheel and is afterward polished on a muslin wheel to which a stick polish is applied.

In final operations the wheel is hand wiped, using a solvent to remove finger marks, is given a final inspection and is then ready for shipment to the plant in which the wheel is assembled to the steering post. In its completed form the wheel becomes one of the most attractive units in the car and is an excellent example of the remarkably stylish assemblies which are possible by suitably combining plastics with bright or enamelled parts such as die castings.

Final cleaning and inspection is done on a vertical-spindle "spinner" which can be rotated at will by a friction driving device or stopped in any desired position.

MORE BIRTHDAY HONOURS

What Our Readers Think of "Plastics"

"Plastics" Helps Publicity

The Lyceum Press, College Lane, off Hanover St., Liverpool, 1

Dear Sir,—I understand that "Plastics" celebrates its first birthday with the June issue and I write to offer my congratulations. As a keen student of Industrial Design I have watched with interest your pages and the progress made in functional design in relation to plastics, which is undoubtedly one of the most mobile of materials used (and abused) in this age of "streamline." I should also like to take this opportunity of thanking you for publishing a recent query of ours regarding the use of plastic materials in bookbinding, which was immediately answered with most helpful assistance by three well-known plastic manufacturers. With best wishes for your continued success. Yours faithfully,

A. W. Reader,

Director, Samuel Hill and Reader, Ltd.

Plastics Authority on "Plastics"

74, Kew Bridge Court, W.4

Dear Sir,—About 14 years ago when you were editing a more purely scientific journal than "Plastics," I remember discussing with you the possibility of producing a journal devoted entirely to plastics—not merely a trade journal but one that would show the world what plastics mean and one that would show manufacturers, whether they be ship builders, electrical manufacturers or fancy goods producers, how their industry could be extended and improved. In those far off days, I think neither of us conceived the wide-flung utility which these new materials, for they were very new then, were destined to achieve in the course of a decade. Now you have produced such a journal and it has already been running a year. You, as one of the heralds of the new synthetic age, have made the meaning of the term plastics known to many thousands who would have remained in ignorance of its true significance, and much more important, have shown them how our industry can aid them in their own sphere in no uncertain fashion.

Of the production of the journal itself there is no need for me to speak. An inspection of any issue will show the high standard achieved.

May your good work long continue. Yours sincerely,

H. Courtney Bryson.

A Dentist's View

Garmouth Lodge, 80, Ewell Road, Surbiton

Dear Sir,—As a fairly regular reader of your most excellent publication "Plastics," I should like to express to you the pleasure that the perusal of your paper has given. The articles I have found not only up to the minute but extraordinarily detailed and most comprehensive even to the lay mind, and I must say, I do feel you have handled an extremely difficult task in a most amazing way. Without any particular knowledge of some of the specific trades to which plastics apply, one could, nevertheless, work up a great interest in reading your articles and I do wish your paper the success that it undoubtedly deserves. With compliments. Yours faithfully,

W. Mellish.

Builders' Merchant

87, Netherfield Road, Nelson, Lancs

Dear Sir,—June has passed and with it the first anniversary of "Plastics," a journal devoted to the manufacture, uses and potentialities of plastic materials. I have been a reader of this valued journal since the first issue and have found it very useful, interesting and educational. As one who is engaged in the building trade, it is essential that every far-seeing builder should become a subscriber to "Plastics" to keep in touch with the new ideas which one reads about in this journal. In last month's issue of "Plastics" there is an article, the heading of which is "Wanted—a Plastics House." Before the next anniversary is here, I hope to read in one of the issues, "The Plastics House Has Arrived," and that the manufacturers of plastics have joined together, contributing with brains and finance to have one built for exhibition.

I hope soon to read in "Plastics" a suggestion to the manufacturers for a permanent travelling stand to tour all the small trading exhibitions, showing plastic materials and their uses, but not for selling purposes. In conclusion, I hope to see "Plastics" read by the layman with the same interest as he reads his daily paper. Wishing "Plastics" every success for all future issues. I am, yours truly,

Frank Roberts.

THE INDUSTRY'S OPINION - - - -

17-19, Stratford Place, Oxford Street, London, W.1

Dear Sir,—The approaching first birthday of "Plastics" gives me an opportunity of offering my heartiest congratulations on your achievement. "Plastics," at once comprehensive and practical, fills the gap in the field it covers—and does it remarkably well.

May it long continue to enjoy the success it deserves.

Yours sincerely,

Harold Mayer,

Promotion Division, Publicity Bureau, British Cellophane Ltd.

Abbey House, Baker Street, London, N.W.1

Dear Sir,—I have noted with pleasure that your paper is about to celebrate its first birthday and I would like to take this opportunity of wishing "Plastics" a successful future. Since its inception I have read your paper with interest and I must congratulate you on the number of interesting articles you have published and the way in which you have presented these subjects to your readers.

With kind regards, yours truly,

P. A. Delafield,

F. A. Hughes and Co., Ltd.

Western Avenue, London, W.3

Dear Sir,—We are very pleased with the article "Lining Steel Plant with Rubber" which appears in the May issue of "Plastics." As a matter of fact, we think this article is going to do us good, and we received an enquiry the following morning from a gentleman from the Argentine.

We, of course, see "Plastics" on the bookstalls, and it is bound to catch the eye of members of the trade who are interested in these matters. The general public are beginning to be curious about the constitution of these materials and we think it is an excellent idea to explain what plastics really are in a way that can be read by the million. We think the style and make-up is excellent and we have nothing but praise for your efforts.

Yours faithfully,

N. Swindin,

Director, Nordac Limited.

"Astor House," Aldwych, London, W.C.2

Dear Sir,—I have pleasure in congratulating you on "Plastics'" first anniversary. I believe that "Plastics" caters for the sales and commercial aspect of the industry far better than most papers. This is confirmed by the gratifying response to our advertisements, which is a true indication of a paper's worth. I also think your paper is doing valuable service as a connecting link between the trade and the public by being available on bookstalls and the news interest it contains. Wishing you every success for the future. With best wishes,

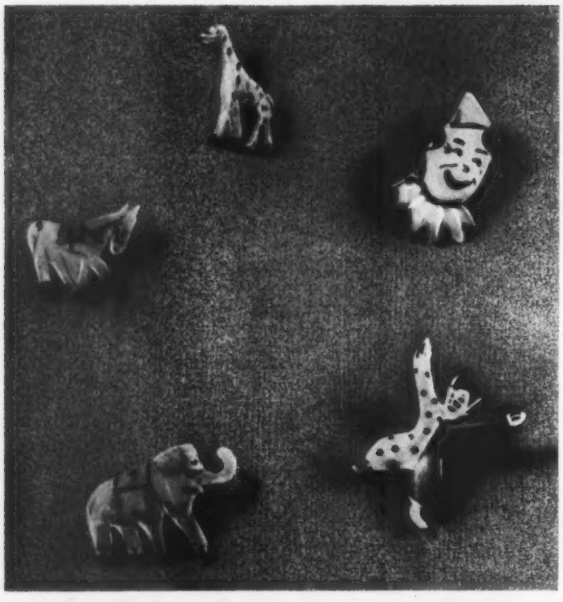
Yours sincerely,

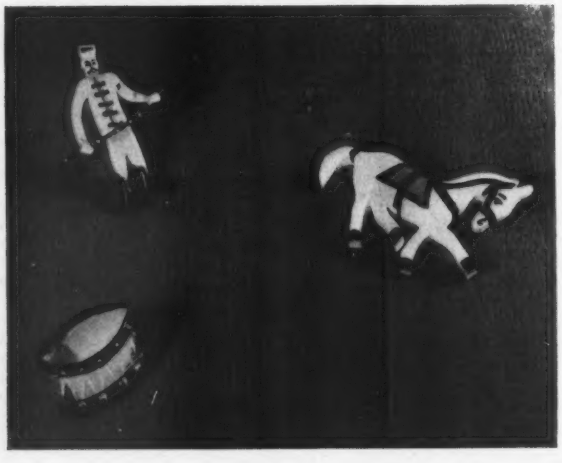
Andrew Fraser.

HOUP-LA!

Schiaparelli Designs "Circus" Jewellery in Catalin

More than a children's corner in one of the big stores. Schiaparelli has gone to the sawdust ring for new ideas for dress and hat decorations.





ALAS! that Whimsical Walker has passed into the bourne whence no circus clown returns. How his simple humorous spirit would have been delighted with the new show at Whiteleys and Selfridges, where large stands are solely devoted to the exposition of Catalin jewellery, created by the famous French dress designer, Schiaparelli.

On first catching sight of this display we imagined it had been constructed solely for the delectation of kiddies, for here was a complete circus of Joeys and pantaloons tumbling and tight-rope walking, comic donkeys and savage tigers—and horses gaily prancing round the drums in the sawdust ring. Yet in this miniature circus there was even more colour and glitter than the real thing, for animals and clowns were all made of transparent or translucent hand-painted Catalin in the traditional circus colours, brilliant scarlet, blue and yellow.

Well may the children have cast longing eyes on them! So, too, did the grown-ups, for each object was a lapel-ornament, brooch or clasp that would give added attraction to the smartest ensemble. The brightly coloured drums and laughing clowns' heads were of special interest to those who liked novelty in the way of belt clasps, and the stern ringmaster, complete with whip, was an amusing but charming idea for a brooch.

The fashion of lapel ornaments for costumes has apparently been revived again by this versatile designer, for there were many varieties to be seen amongst our circus friends.

This beautifully hand-painted circus jewellery is exceedingly popular with the smart American women, and is proving to be just as pleasing to our own ladies of fashion.

HIGHLIGHTS AND SPOTLIGHTS

THE applications of plastic materials in the cinema increase in importance almost every year and it is no exaggeration to say that they contribute a great deal to its attractiveness and safety.

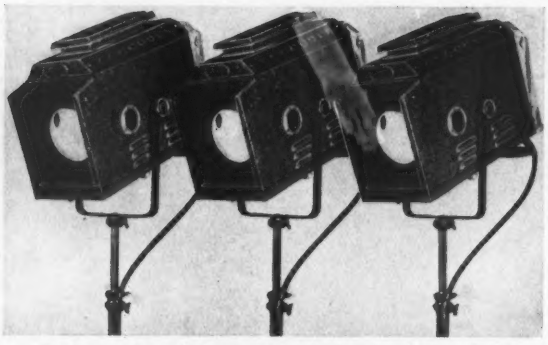
Until a comparatively few years ago, coloured gelatine sheets were used almost exclusively for floats, battens, floodlights and spots, but they were found to suffer several rather serious disadvantages, the most important being their inclination to blister and buckle when subjected to the continuous heat of the lamps. Their replacement by a special cellulose acetate material has meant a considerable increase in efficiency and ensured a much longer life. One of the best-known forms of sheet acetate for coloured lighting schemes in cinemas, theatres and other public places is Cinabex, which is now available in 30 different colours, the range including all the usual standard tints required in cinema and theatre lighting. A point of great interest to cinema managements is that cellulose acetate recommended for this purpose is not just ordinary coloured sheeting, but rather one which has been specially adapted for this particular use and is approved for use in public places by the licensing authorities. It is durable, tough, and resistant to heat, as well as being stable to light, highly transparent, easily cut, jointed and bent. Unlike gelatine, it is not readily marked or disfigured by handling and does not curl.

Cellulose acetate also finds spectacular uses in the decoration of the giant electric organs now installed in most cinemas. Panels of brilliantly coloured sheet acetate material are used with excellent effect to make the cinema a focal point of attention. Quite recently some interesting experiments have been made with fluorescent sheeting which glows mysteriously when subjected to invisible ultra-violet rays from concealed lamps. This is a new and exceedingly promising idea which might well be exploited for original wall decorations.

It is now becoming the fashion to dress up the stage with flowers, shrubs and other floral decorations, and here, again, plastics, in the shape of gaily coloured artificial flowers made of Rhodoid or some other form of cellulose acetate, are proving great assets as they retain their pleasing appearance indefinitely and can be washed without suffering any ill effects.

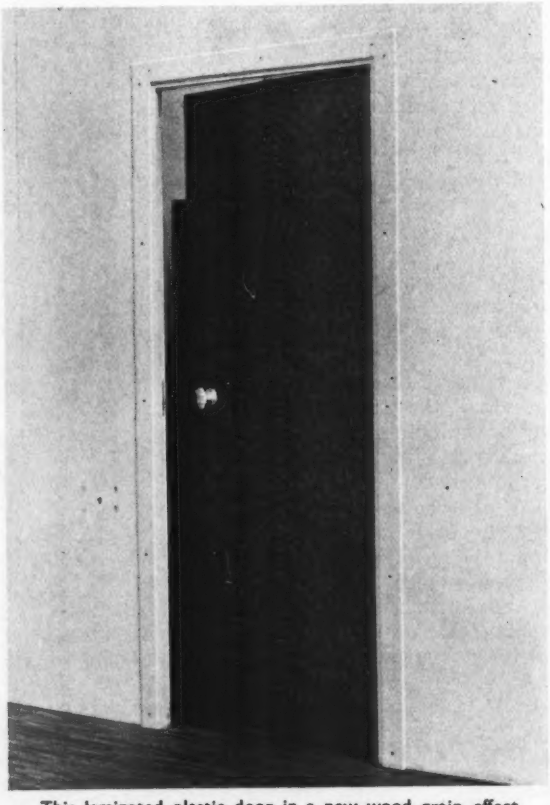
Another interesting but often overlooked use for cellulose acetate is for the letters which build up the names of screen titles and stars for displaying on the canopy over the entrance to the foyer. These acetate letters, which are available in a number of bright colours, are excellent for the purpose, and unlike those made of painted sheet metal they do not chip or show any signs of wear even after years of exposure to the elements.

So far thermo-plastic materials have had most say



Cinabex coloured sheets have displaced gelatine sheets for spotlights.

The transparent backs and seats of these steel chairs for stage turns are made of Celastoid cellulose acetate.



This laminated plastic door in a new wood grain effect was exhibited by the I.C.I. at the B.I.F., 1938.

in the furnishing of cinemas, but it must not be thought that thermo-setting materials are finding no applications in this new and remunerative field. One of the most intricate and accurate mouldings of modern times is the cinema organ disc, moulded of phenol formaldehyde resin by Insulators, Ltd., for the Compton electric organ. It stands up to hard wear better than any competitive material and fulfils all the conditions as regards non-conduction of electricity.

Mouldings also find application for door furniture, ventilators, air conditioning components and fans, all of which are now regarded as essential in the up-to-date cinema. A recent move of considerable interest to the plastics industry is the use of opaque and transparent lampshades moulded of special amino resins. These are a good deal lighter than glass, and if for some reason they become detached from the fittings and fall on the audience there is little likelihood of any injury being caused.

Wall surfaces can also be made of plastics in the form of laminated material, such as Bakelite, Roanoid, Traffolyte and similar products. These are exceptionally durable, hygienic and attractive, and may be obtained in a great variety of colours and patterns. When these materials are used they may be regarded as completely permanent and there is no risk of the colours fading or the wall surface losing its smart appearance. Washing with soap and water to remove surface dust has no injurious effect on the panelling. Although making no claims towards being fire-proof, there is no doubt that the use of these laminated materials renders the cinema a good deal safer than if thin lacquered veneers are used.

An idea which appears to have excellent decorative possibilities is to make use of extruded rods of cast resin in the form of columns or other likely shapes. Two such columns made up of a number of rods, which we illustrate at the beginning of this article, were exhibited by Catalin, Ltd., at the B.I.F. and focused a good deal of attention. As these cast resins can be obtained in almost any colour, as well as in the glass clear variety, it is possible to obtain many interesting and even bizarre effects. Another suggestion is to make use of rods of Perspex, which possesses the almost uncanny property of carrying light in the same way as a tube carries water. Thus with this material light can be twisted and turned in any conceivable direction. An imaginative artist could with these varied synthetic substances create original decorative effects likely to encourage discussion, curiosity and even criticism, but in any case he would most certainly achieve the management's aim by merely making people talk about these strange effects.

Apart from the auditorium, which is, of course, the real business end of the cinema, plastics find several other applications. For instance, the foyer can owe a good deal of its attractiveness to the combined efforts of rubber and laminated material. Doors covered with impregnated designs in paper or fabric strike a new and unusual note, and so also do wall decorations in the form of bands of alternating colours in laminated material. These are some of the latest suggestions for modernizing the cinema and giving that greatly desired appearance of up-to-the-minute planning. By the wise and generous use of plastic materials cinema managements can obtain original and striking effects with economy and certainty, and in these days of keen competition between rival companies managements cannot afford to be behind the times.

THIS SELLING BUSINESS

By

CYRIL DINGLEY

The well-known Sales Manager of British Industrial Plastics, Ltd., tells how the buyer of plastics can reap benefit from the sales department, the true liaison between customer and factory.

IN a recent News Letter from America there appeared the following paragraph :—

> "There are folks that say Sales Promotion is the tactful handing out of cigars to the right people at the right moment. Others, more enlightened, say that Sales Promotion is a co-ordination of the work of the Advertising and Sales Departments."

The cigar methods may be controversial—certainly on ethical grounds, and further, some cigars of doubtful vintage might easily lose a customer instead of gaining one. Co-ordination, on the other hand, must appeal to anyone interested in plastics—co-ordination and co-operation of the Sales Department not so much with the advertising as with the works and designs department in promoting the sales of mouldings. If there is one industry in which such co-operation is essential it is the plastics industry, and the co-operation to be complete must include not only the departments referred to but the customer as well.

Plastics embrace so many raw materials; can be applied to replace so many existing materials; can be put to so many new uses, and there are so many ways of tackling a job in plastics that the best results can be achieved only by co-operation of all parties concerned.

Some customers think they know all there is to know about plastics—wise people in the plastics industry would not make that claim themselves knowing that there is always something to be learnt.

The idea still lurks in the public mind that plastic mouldings are unbreakable, and this may be responsible for some designers outside the industry specifying sections and shapes for moulded parts not really suitable for the service expected of them. Here is where co-operation is necessary. Both the sales departments and the works should realize that their first duty is not merely to dispose of mouldings but to supply goods which are going to give satisfaction to the customer. It is often not good enough merely to quote against customers' specification. The use to which the part is to be put and the service expected of it should be known to the moulding firm. The design and specification should be carefully considered by the latter, advice given and recommendations made where improvements can be effected for the article to serve its purpose with maximum efficiency.

If a representative approaches a prospective customer, gets an interview and is handed an inquiry with a blue print of something for which a quotation is asked he need not think that half the job of the sales department is done—it has scarcely started. They, in consultation with the works and designs department should study the inquiry, as so often there are ways in which the design can be simplified to ease moulding without reducing its efficiency, and this may make possible a reduction in production costs, which when reflected in the price of the article is always happily regarded by a customer.

There has been on the market too much shoddy stuff which has not done the industry any good. It has been bad in design, poor in quality and not suitable for its intended purpose. There are so many avenues and outlets for plastics where they are ideal materials that it is a thousand pities that effort should be misdirected in turning out lines which do no one any good, certainly not the purchaser—or the producer either in the long run.

He was a philosopher of much wisdom who made the remark "Quality persists long after price is forgotten." Quality pays in the long run and is worth paying for. This applies to moulds as well as mouldings. Skilfully designed and well-made moulds pay for themselves, as the good work put into them is reflected in the mouldings they turn out, whilst efficiency in operation and freedom from breakdown save money in the end and avoid disappointment on the part of customers who expect good and regular deliveries. A nig-

gardly attitude with regard to moulds is a short-sighted policy and is comparable with unwisely cutting down one's insurance premiums.

The moulding firm's designer plays an important part in the scheme of co-operation, as success, measured in sales and satisfaction, is largely dependent upon design. The designs department should not be the Cinderella of a works, for after all design is of paramount importance. Outwardly it is the expression which persists for the life of the product and inwardly it is responsible for factors which govern its strength and performance.

The idea of a man being called a designer because he is "pretty useful with the pencil" is, fortunately for the industry, rapidly becoming out of date. The designer in the plastics industry should be one whose education has developed his artistic ability, and part of whose training has essentially been within the plastics industry; a fleeting knowledge of the operations of moulding is not enough; he must know something about tool design and construction and must be familiar with the latest developments and progress in the moulding shop. Close touch with the estimating department is essential, for in the plastics moulding trade price plays just as important a role as in other industries. He should be free to spend time away from his drawing office seeking inspiration or stimulating his ideas, and there are many occasions on which he could with advantage be brought into consultation with the customer or the latter's designs department.

Business can be regarded more and more as a sort of partnership of customer and supplier, particularly as regards the moulding industry. The one is just as interested and as keen as the other that the final product of which a moulding may form a part should be the success which leads to further orders, and it is by co-operation that this can best be achieved.

The sales department makes first and most contact with the customer. It should not work as an individual unit. Its function is to represent its firm in the fullest sense, therefore it should be in closest possible touch with the works, the estimating and designs departments. The true salesman is not the individual with the pencil and notebook, ready to scribble down an order and having to refer every query back to headquarters, but is one who, with the benefits of close co-operation with his works, makes his customers realize that his firm is a co-ordinated unit and not a series of separate departments; that as a whole it is interested in being of service in the creation and production of what is required.

An organization is a happy one where the individuals do not seek personal credit but all pull together for success and advancement of the firm as a whole.

This emphasis of working together is not merely a platitudinous sentiment—it is really necessary, for it is only by internal co-operation and co-ordination that a firm can give of its best. Thus will it be enabled to satisfy those whom it professes in particular to serve and at the same time reflect credit on its own industry.

In the words of Kipling:—

"It aint the individual or the Army as a whole,
It's the everlastin' team-work of every bloomin' soul."

New Synthetic Fibres for Chemical Filters

It is reported from Berlin that one of the leading plastics manufacturers is now producing filters for chemical plants made of fibres of a special vinyl resin. As the resin has an exceedingly high resistance to the attack of concentrated acids and alkalies, it is also to be used for weaving into cloth for protective clothes.

"Cellophane" Makes Good in Textile Manufacture

Textile manufacturers in America are making increased use of "Cellophane." Narrow ribbons of the film have been woven into cloth, providing brilliant high-lighting accents for dress fabrics and drapery materials. Lamination of "Cellophane" to other products is another recently developed use, as by this means textile goods can be given a lovely sheen, and fine-mesh fabric converted into a practical material for shoe bags, dress covers and other protective articles. "Cellophane" is also employed in the manufacture of wall coverings, rugs, curtains, shoes and handbags. The versatility of this dainty transparent film is truly amazing.

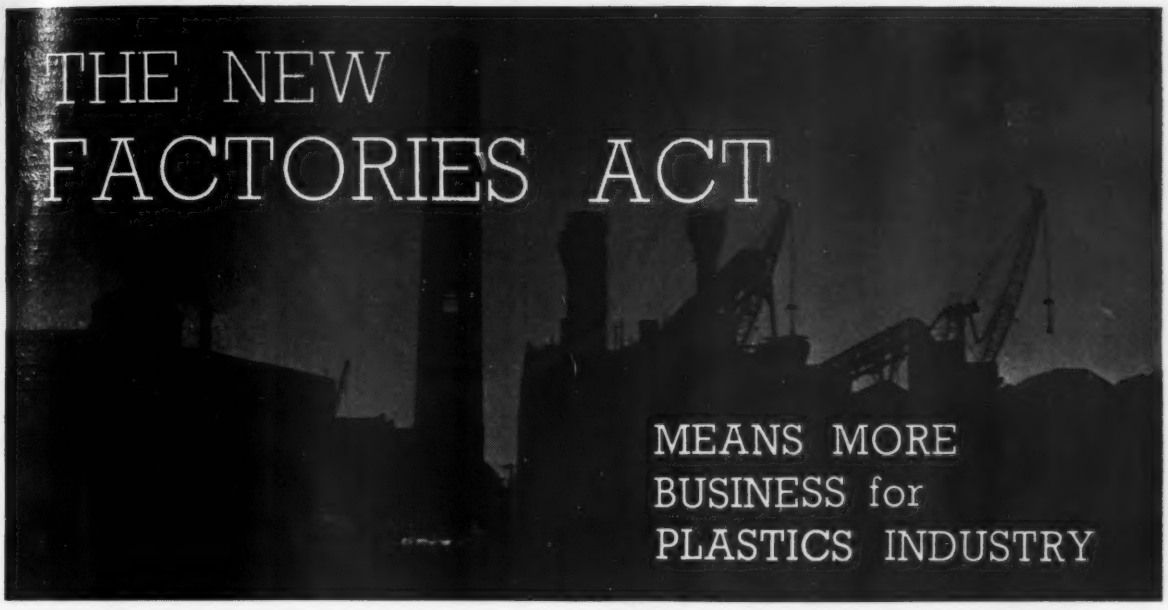
Not For Sale

These horn jugs and tumblers are displayed at the stand of the Aberdeen Combworks Co., Ltd., Aberdeen, at the Empire Exhibition, Glasgow, and are attracting a good deal of attention, so much so, in fact, that there is seldom a day passes without someone offering to purchase the set. However, they are not for sale and only exhibited as examples of the exquisite artistic results obtainable by the skilled use of horn.

These particular exhibits were made over 40 years ago at the Aberdeen works of the company, and the painted decorative effects were obtained by a process in Yokohama which was unobtainable, at the time the goods were produced, anywhere else in the world.

Besides these museum pieces this well-known firm is displaying a wide selection of their popular lines made from various kinds of horn, and we recommend readers who are visiting the Exhibition this summer to pay them a visit.

These artistically decorated horn drinking vessels are attracting a great deal of attention at the British Empire Exhibition, Glasgow.

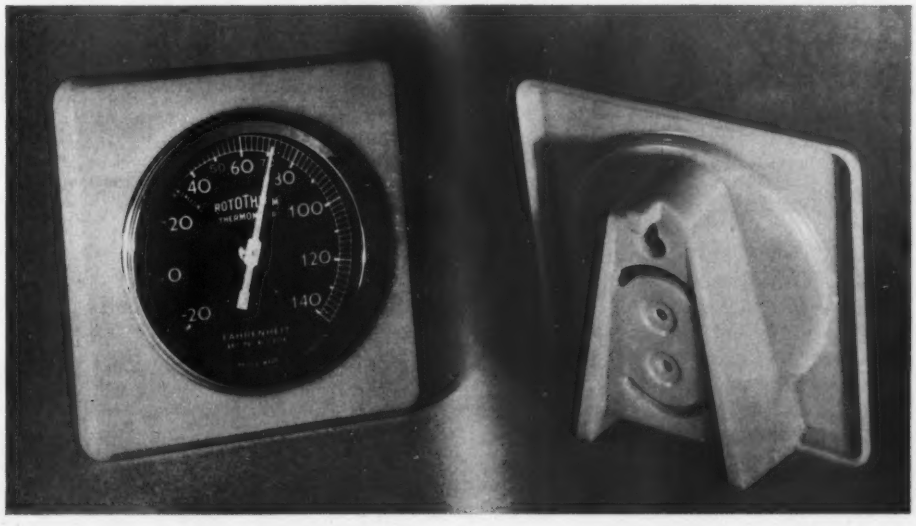


SOME of the new regulations which came into force on July 1, 1938, are of particular interest to the plastics industry, as they open up possible new markets for moulded and other types of equipment.

The Act provides that in every workroom where a substantial proportion of the work is done sitting and does not involve serious physical effort, a temperature of less than 60 degrees shall not be deemed, after the first hour, to be a reasonable temperature while work is going on, and at least one thermometer shall be provided and maintained in a suitable position in every such workroom. Temperature gauges in moulded frames are eminently suitable for factory workshops, as they do not corrode or discolour when subjected to atmospheric gases. An excellent example of this type of thermometer is afforded by the 2½-in. dial Rototherm model, which is equipped with black and white dial, and white pointer and key slot for hanging on the wall. Moulded cases of Pollopas are available in red, black, light green, blue, ivory and orange. This instrument sells at the reasonable price of 4s. 6d.

Section 41, which deals with Welfare, requires that there must be provided and maintained an adequate supply of wholesome drinking water conveniently accessible to all persons employed, and at each point of supply one or more suitable cups or drinking vessels must be supplied. Obviously, moulded receptacles are the most suitable, and there should be an excellent market here for simply designed and really strong tumbler-shaped containers made of white or light-coloured amino resin. These could have the name of the firm impressed on the side to discourage petty thefts.

As regards the provisions under the Act made for the accommodation of clothing not worn during working hours, it is clearly stated that adequate and suitable places for such clothing must be provided and maintained for the use of employed persons. Cupboards could be constructed of laminated material at an



The frame of the Rototherm wall thermometer is moulded of Pollopas by Prestware, Ltd.

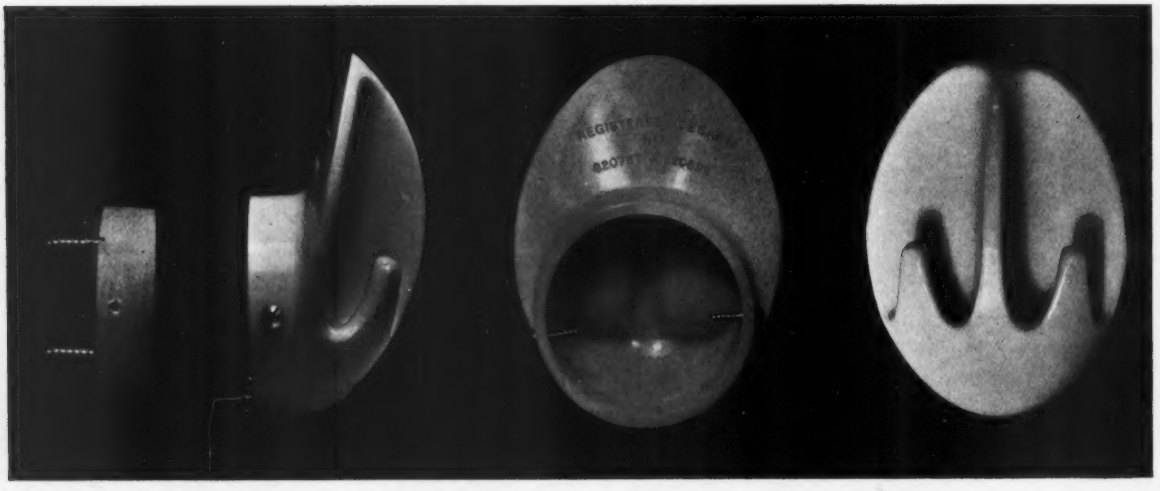
economic price; they would be ideal for the purpose, and, of course, they would never need painting or require any attention. It might be worth while for some enterprising manufacturer to consider this suggestion, especially for factories where luxury products are being made.

One of the special provisions and regulations dealing with health, safety and welfare concerns the protection of the eyes in certain processes. The new Act requires that in any process specified by regulations, being a process which involves a special risk of injury to the eyes from particles or fragments thrown off in the course of the process, suitable goggles or effective screens must be provided. Laminated glass or goggles made of cellulose acetate or Perspex should prove very useful for a number of industrial purposes where hazardous conditions are known to be present. It is interesting to note that the previous law contained no general provisions as to the supplying of goggles or screens.

In all factories effective and suitable provision must be made when the new Act comes into force for securing and maintaining, by the circulation of fresh air, the adequate ventilation of every workroom. This will mean that more fans will have to be installed in a large number of factories, and, when considering the specifications of new fans, manufacturers will undoubtedly consider the claims put forward in favour of blades made of Micarta and Tufnol, which are able to stand up to corrosive conditions of service without any noticeable deterioration. For acid-laden atmospheres, or where the humidity is very high, plastics can give better service than any of the non-ferrous alloys.

It will well repay executives in the plastics industry to study the 1937 Act and find out possible new applications of moulded, laminated or thermo-plastic materials. There are undoubtedly many ways in which the materials of our industry can help in the enforcement of the new regulations.

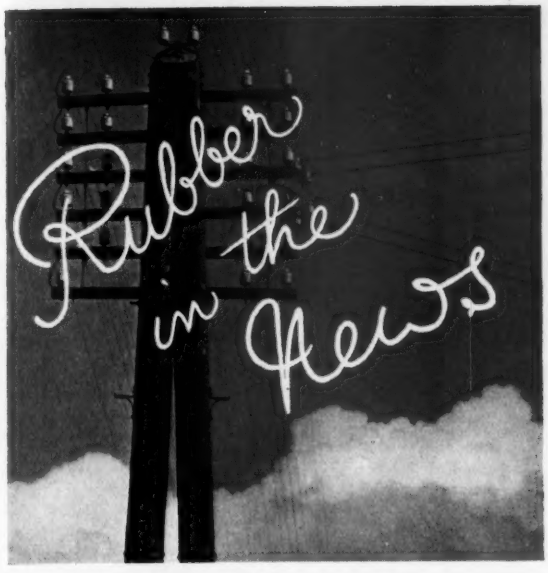
FULL MARKS FOR THE HAWKES COAT-HANGER



This photograph shows the moulded coat-hanger from all angles and so illustrates the ingenuity and neatness of the design. It will be noticed that the wooden plug is first screwed into the wall and the moulding screwed on to this when it is in position.

ALTHOUGH only a small, and some might think insignificant, item, we consider that H. E. Ashdown (Birmingham), Ltd., deserve praise for designing and moulding this serviceable little gadget for O. C. Hawkes, Ltd., Birmingham. It is moulded of amino resin powder, and its lustrous and pleasant surface is particularly pleasing. Our own opinion is that where this coat-hanger scores over those made of metal is the fact that it is so neat and unobtrusive. Although able to support a coat, mackintosh on the two prongs, and hat at the top of the hanger, it takes up very little space, and even half a dozen would not appear unsightly in a hall or cupboard.

Incidentally, this coat-hanger was designed specially for O. C. Hawkes, and forms one of their most popular and best-selling household fittings. It was exhibited at the B.I.F. and also shown at the recent Ideal Home Exhibition. Public reaction has been very favourable, and this shows that where modernity is coupled with serviceability success is assured.



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IN view of the fact that rubber finds its principal application in the insulation of electrical wiring and that every effort is made by the manufacturer to ensure the highest degree of non-conductivity, it is somewhat strange to read of efforts being made to make rubber electrically conductive.

Until a comparatively short time ago the only really practical way to improve the electrical conductivity of rubber was by loading it with powered charcoal, graphite or lamp-black, but even then the product varied a good deal in its electrical properties and the durability was such that its use was hazardous. Now a new technique has been developed and commercialized by the Dunlop Rubber Co., Ltd., which, it is claimed, will enable a range of electrically conductive rubbers to be made which possess good wearing properties.

The applications of conductive rubber are very numerous and are intimately connected with the prevention of explosions and fire. It is, for instance, now being used extensively for aeroplane tyres to effect the discharge of static electricity on landing, and this does away with the necessity of trailing chains or wires, which, apart from being awkward, are positively dangerous. For high voltage cables the use of conductive rubber prevents the formation of ozone by entirely eliminating the field set up in the surrounding air when ordinary non-conductive rubber is employed.

This new form of rubber is specially suitable for making floors and mats which will reduce the danger of fire in factories, due to sparks caused by static electricity. It will at once be realized that in hospital operating theatres where ether or other inflammable vapours are being used there is always present a grave risk of explosion if there exists a considerable difference of electrical potential, and the only way to reduce this is to install either conductive rubber floors or mats. The same danger applies to factories where the atmosphere is charged with fine dust.

★

A recent patent should prove of interest to building contractors, as it covers the production of new latex-cement compositions. These are made by mixing hydraulic cement, lime plaster, gypsum or other similar materials with water and then adding latex or synthetic rubber and allowing to set. Cork meal, wood flour or chips may also be added to obtain special effects. This improved form of cement should prove very useful for flooring where a certain resiliency is necessary.

★

Rubber is finding several new and interesting applications in marine engineering and one of the latest is its replacement of lignum vitæ for tailshaft bearings, where the silt in water is liable to cause rapid wear. The use of rubber for this purpose does not entail any risk of deterioration when dry docking, as special anti-oxidants can be incorporated in the rubber to reduce any possible ill effects due to exposure to air.

★

It has just been revealed that the now well-known "Rigmel" shrinking process for textiles owes its success to the novel use of rubber. In principle, it is the recoil of rubber which enables the fibres to reach in one operation the zero-shrinkage point which only results from several launderings. In their early experiments, officials of the Bradford Dyers' Association, Ltd., stretched a length of sheet rubber almost to its maximum and then placed down on it a piece of damp cloth. The two were then subjected to pressure in an ordinary office press and the rubber released; when it had contracted, the press was opened and the cloth taken out. It was found to have shrunk considerably.

★

An interesting and promising substitute for natural rubber with many of the latter's most important properties can be made from tung, soya bean and other vegetable oils. The new rubber is made by heating a mixture of tung oil and glycerine to about 410 to 450 degrees F. until reaction takes place. No milling is required.

★

A rubber racket string, said to be as strong as the best gut string, has just been patented. It consists of a rubber core under tension with a strong outer cover tightly braided about the cord. The braid holds the rubber core in extension and compression, which allows the core to exert a radial pressure upon the braiding.

★

The largest rubber-lined tank in the world, having a capacity of 120,000 gallons, was recently installed in the works of Consolidated Chemical Industries, Texas, U.S.A. The tank, which is used for the storage of hydrochloric acid, is of welded steel plate construction and measures 26 ft. in diameter, 25 ft. in height, and the "Triflex" rubber lining supplied by the Goodrich Co. is $\frac{3}{16}$-in. thick.

★

The rubber foot-bath is the latest sports accessory and it is being issued to many prominent sporting authorities in America for use in connection with special fungicides for the prevention of athlete's foot. C. Dodge Co., Westport, Connecticut, U.S.A., are the manufacturers. The bath has an overall length of 12 ins. It is equipped with a sponge rubber insert which facilitates contact of infected skin areas with the fungicidal solution.

★

The Signal Manufacturing Co., Lynn, Mass., are now making all rubber licence plate frames which eliminate the annoying rattle so often caused by metal frames. They also prevent injuries from rough edges and cannot break or bend. Four colours are available—black, white, maroon and green.

★

Recent experiments in Germany on the use of latex in leather manufacture have revealed several new and promising applications. In the production of gas meter and piano leathers it has been found that the use of special latex emulsions enables a leather to be produced free from all pin holes and other defects which make the skins porous.

Clothing leathers sprayed with a dilute latex solution are stated to be superior to goods treated with nitro-cellulose lacquers. As the rubber film is a good deal more elastic than the cellulose one, the leather finished with latex has a better feel and is softer to handle and wear. There is no doubt that if latex proves useful in the finishing of clothing leathers it will probably be used by glove manufacturers, who are in constant need of really good wear-resistant finishes.

★

"The Wonder World of Chemistry" is to be E. I. du Pont de Nemours and Co.'s contribution to the New York World's Fair in 1939. One of the many processes mentioned for demonstration in the laboratory is the creation of synthetic rubber.

★

Nothing destroys the efficiency of waterproof garments so quickly as sunlight. Cracks develop, water and other liquids seep through, deterioration begins and soon the fabric is no longer serviceable.

Recently, comparative tests were made to determine the sunlight resistance of two types of raincoat fabrics. One was coated with rubber, the other with Neoprene. Both were exposed to the intense rays of the Florida sun at Hialeah by chemists of the Du Pont de Nemours Company. The sunlight opened serious cracks in the rubber-coated fabric, but the Neoprene-coated sample came through the ordeal with its physical structure practically unimpaired. Even when photographed under 22 magnifications, the surface showed only slight checking. This result is not surprising, for Neoprene is little affected by sunlight. Rubber-coated fabrics are entirely satisfactory for many purposes, but for others a Neoprene coating is better.

★

Probably the hardest wearing upholstery material in the world is now being produced at Fairfield, Connecticut, the rubber headquarters of Du Pont, for use in caterpillar land tractors. The material is a rubber-coated upholstery fabric known as "Cavalon," and it is pliable, has an almost unbelievable resistance to flexing and an extremely high surface abrasion co-efficient. It was originally used for the tops of motorcars, but recent experience has shown that there is a new and rapidly expanding market awaiting it for upholstering automobiles, and particularly commercial vehicles where the abrasion is likely to be unusually severe. It is rapidly being realized that badly worn upholstery dates a vehicle more than anything else and plays havoc with its chance in the second-hand market.

★

The rain cape of Pliofilm worn by the rather bewitching young lady in our illustration weighs less than four ounces and can be carried quite easily and unobtrusively in a handbag. Messrs. Richards, Boggs and King, of 1 and 2, Berners Street, London, W.1, have the sole manufacturing rights in this country for waterproof garments made of this new transparent rubber film produced and sold exclusively by Goodyear. Pliofilm is manufactured in practically all hues of the rainbow in transparent, opaque and metallic shades. The film has an average thickness of $1\frac{1}{2}$-$2\frac{1}{2}$ thousandths of an inch and is very tough. It will not tear easily, is inherently waterproof, and may be soaked in water indefinitely without losing that quality. Moreover, it can be welded by heat and will not dry out or crack. While it is similar in appearance to cellulose and acetate wrappings, Pliofilm possesses technical properties which make it a greatly improved material for packaging purposes, and, because it is odourless, it is ideal as a wrapping for perishable goods.

Elasticity, which is roughly twice that of cellulose wrappings, prevents puncturing of the sheet when drawn over sharp or pointed corners of a package. Humidity has no effect on Pliofilm, and it is resistant to the action of oils, greases and acids. Its uses are manifold and rapidly increasing. Some of the future applications will include beauty parlour aprons and oxygen tents, the latter because Pliofilm is non-permeable and thus prevents the escape of gas, at the same time permitting unhampered inspection of the patient in the tent. There, we understand, are several other rather unusual possibilities for Pliofilm in the hospital.

FROM PARIS—

COMES THIS NEW COFFEE PACK OF ACETATE SHEET

HOW to preserve the delicate aroma and exquisite freshness of newly ground coffee has puzzled experts for some years now. It was thought, only 18 months or so ago, that by canning coffee under vacuum a complete solution to the vexed problem could be found, but, unfortunately, experience discovered at least one important drawback. Once the tin of coffee is opened the vacuum is destroyed, and this, of course, means that unless all the coffee is used immediately the remainder loses its freshness and deteriorates in quality. This is inevitable, as the tin holds far more coffee than is necessary for an average family's immediate consumption.

Obviously, canning on an economical scale is not an ideal method, and what is needed is some kind of lightweight, low-cost receptacle holding just sufficient coffee for three or four persons. Small tins and glasses have been tried out without any conspicuous success owing to their relatively high cost and weight, and, in the case of glass, the danger of breakages.

A revolutionary and really practical solution to the whole problem has, however, now been made by Monsieur Felix Auban, a director of the Café Rodel factory, Paris. He attacked the problem from an altogether new angle, and instead of puzzling his brains how to make small containers of tin, glass or even paper, he considered the newer and more promising thermo-plastic materials. After a good deal of experimenting, he eventually invented an ingenious package made of cellulose acetate sheet material which held 1¾ oz. of freshly ground coffee, sufficient for four to six persons, and selling at 1fr. 40.

The manufacture of this thin and apparently fragile container is quite simple, but has necessitated the invention of a special automatic machine which works with unerring accuracy, and in the early stages about 1,000 completed packings per hour were obtained. This figure has now been considerably increased. The actual production of the acetate package is made possible by the use of two discs of Rhodoid, 0.15 mm. thickness, one being larger than the other. The larger sheet is heat embossed to form a cup, into which the ground coffee is rammed down. The next step in the operation is the capping of the container with the smaller disc of Rhodoid to form a hermetic seal. Two small holes are then pierced in the top of the package and the container placed in a vacuum chamber; the air is drawn off and the holes sealed with a strip of adhesive tape, which is afterwards covered over with the label.

This ingenious coffee container is made of transparent Rhodialine.

Ease of opening is an important feature of this plastic pack, and all that is necessary is to puncture the container with a pin or other sharp instrument to destroy the vacuum and so release the contents.

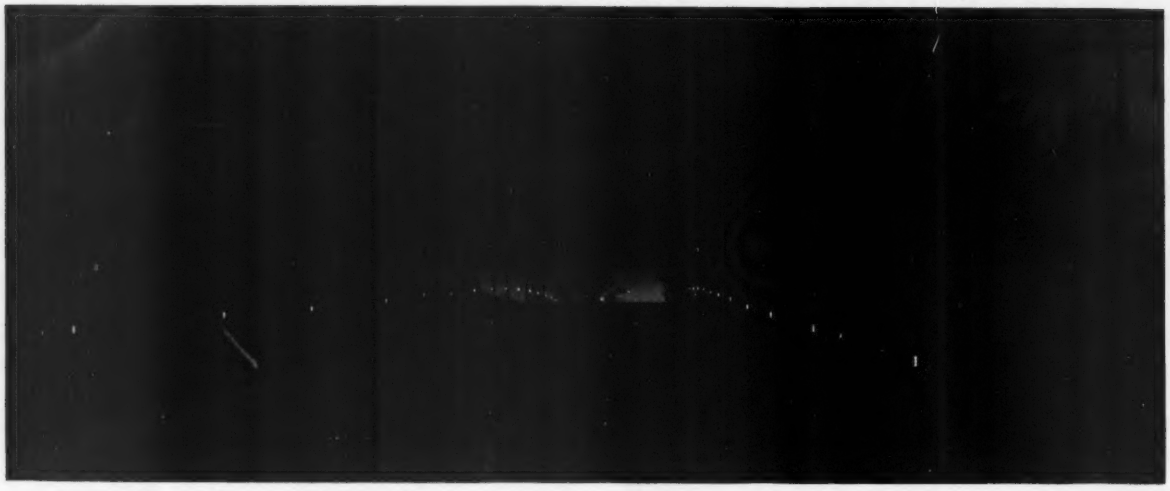
The acetate container is, it is claimed, limited to the package of powdered or granulated products which can be firmly compressed and help to support the thin walls to withstand outside atmospheric pressure. Tobacco is recommended as a suitable material for packing in this way, and a good deal of interest is being displayed, both in this country and America, by leading tobacco manufacturers.

This new application of cellulose acetate illustrates its amazing versatility and adaptability in the packaging field, and heralds a very promising future for it, especially for food, pharmaceutical and beauty products.

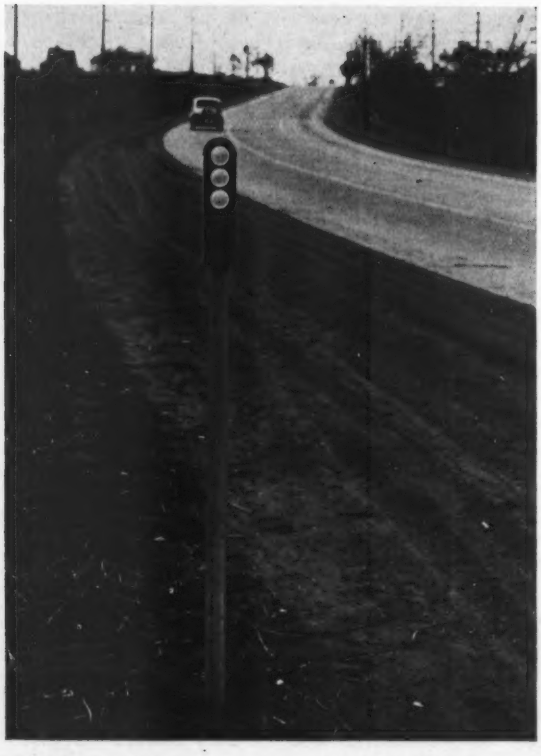
Made to Measure Dress Decorations of Plastics

In the catalogue of a well-known London firm of fashion experts the offer is made to supply customers with original dress decorations and buttons in plastics. This is surely the first time that the word "plastics" has crept into a fashion catalogue, and shows that manufacturers are beginning to believe that the public is growing conscious of the true meaning of this rather vague word which so unfortunately savours of plasticine or the plastic arts. We ourselves have long wished that the products of our industry should be given more publicity, and this start encourages us to think that we shall soon see "plastics" being used on showcards and posters to describe moulded articles in shop windows and other displays.

THERE IS MORE SAFETY ON THE ROADS—



when scientifically controlled reflection is used



The Detroit-Michigan road along which have been erected, at 100-ft. intervals, reflectors made from transparent "acrylic" resin.

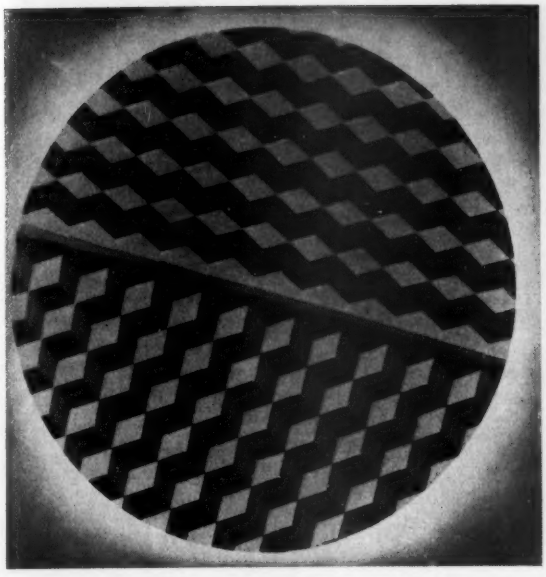
IN our May issue we published a photograph and some details of a new type of 30 m.p.h. road sign in which the circular sheet was a moulding made from Diakon, the transparent "acrylic" resin produced by Imperial Chemical Industries. The moulding, fabricated by Ebonestos, Ltd., was, in effect, a surface composed of 17,000 extremely accurately pressed lenses or reflectors, so that the 30 sign was "lighted up" by oncoming traffic. Reflection results thus secured are a vast improvement over those obtained using the comparatively crudely produced glass reflectors.

A similar idea, applied to small reflectors, has been adopted in the United States of America with completely satisfactory results. The following notes have been abstracted from the well-known American journal *Modern Plastics*. The photographs are reproduced with kind permission of the Editor and of the inventor, Mr. J. C. Stimson, of Chicago.

Recently, Michigan's Highway Commissioner, M. D. van Wagoner, conducted a hundred prominent highway and automotive officials at night over a 90-mile stretch of road between Detroit and Lansing, Michigan, on which had been installed a new system of indirect highway lighting. After the journey, the chief of the United States Bureau of Roads expressed his pleasure in the following statement: "This is a very definite contribution to the safety of the highways and the utility of roads at night. I look for the idea to spread like wildfire."

This new indirect highway lighting system comprises lines of light marking the outer edge of the shoulder of the highway, and resulting from rays reflected from transparent plastic reflectors set at 100-ft. intervals.

The Stimson reflectors are moulded by pressure from



The Stimson reflector which introduces "indirect highway lighting" is based on the cubical system.

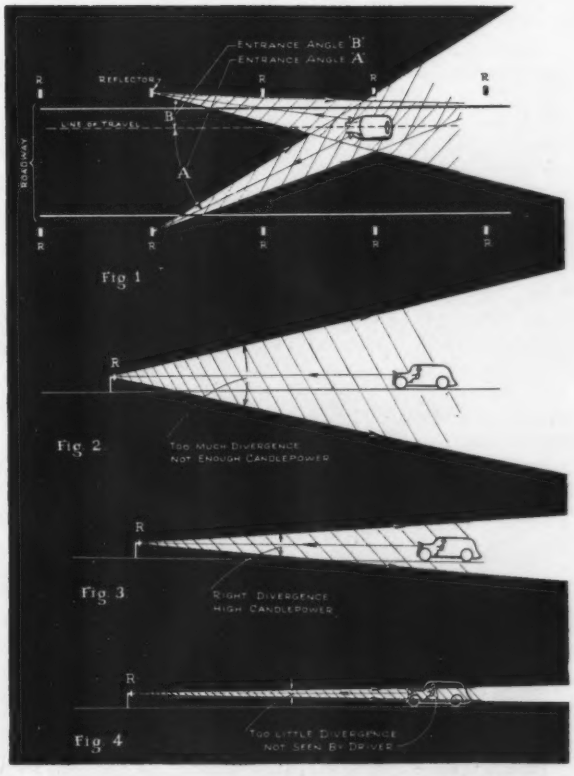
A British type of reflector made by Ebonestos, Ltd., from transparent Perspex. This is also of "acrylic" resin.

the "acrylic" resin called Lucite made in the U.S.A. by the du Pont organization, and which bears a very close chemical relationship to the Perspex of Imperial Chemical Industries, Ltd. Each reflector post holds six plastic reflectors (three on each side), fitted 3 ft. above the pavement and 8 ft. from the pavement edge. Each individual disc measures $1\frac{5}{8}$ ins. in diameter and is formed of some 300 "cubes." Actually three faces of the cube form the reflecting surface. This form has been the result of a long research in optics and gives such a high degree of returned light that the expression "indirect highway lighting" is considered justified. The Detroit-Lansing installation has cost about $340 per mile.

Since the motorist is continually changing his position relative to the reflecting surface, ordinary mirrors are useless, and an optical system capable of returning light back towards the moving car regardless of the entrant angle of the light on the reflector is desired. (See Figs. 1, A and B.) The more closely the returned light is confined the more brilliant does it appear to the observer.

A high degree of such concentration is obtained by the optical method termed retro-directive reflection, and is secured by the adoption of the cubical system, each of the cube corners being a retro-directive optical system in itself. A light ray entering the front surface is reflected on each of the three surfaces of the cube in succession and finally returned towards the observer.

Obviously, of the utmost importance to the success of such a system is the degree of accuracy in the shaping of these cubes. In moulded glass this accuracy would be impossible, and inaccuracy results in widely divergent reflection. Using "acrylic" acid resin, as has been proved by the production of camera and other optical lenses, they can be reproduced comparatively simply and optically accurate in moulds at relatively low cost, since finishing operations such as grinding and polishing are not necessary.



Diagrammatic explanation of the importance of proper reflector design.

Amino Plastic Mouldings for Electrical Purposes

By E. E. HALLS

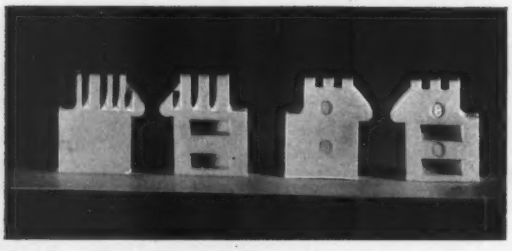
THE amino plastics utilize the resinous condensation product from thiourea, urea or a mixture of the two with formaldehyde as the plastic base. Like the "phenol" products, they are thermo-hardening, becoming infusible and insoluble under the action of heat and pressure. The production of amino plastic moulding powders follows broadly along the same lines as the manufacture of "phenol" moulding powders, and likewise the technique of moulding into articles is closely the same in all respects. The same wide range of fillers can be adopted, but, generally speaking, for electrical mouldings wood flour or paper filled mixtures, having also colouring pigment, are mainly employed. The reason for this restriction lies in the fact that they are selected for one of two important advantages they offer, namely, permanence of colour shade and immunity from "tracking," whereas in their other characteristics they are in general comparable with the "phenol" materials, although in some respects they fall short of the latter.

The amino plastic moulding materials are chemically inert, and no danger of attack upon corrodible metals in contact with them exists under any service conditions of warmth, humidity or electric potential. It is possible, therefore, to make use of any of the commonly employed metals for inserts, or to apply coil windings in direct contact with the moulded insulation.

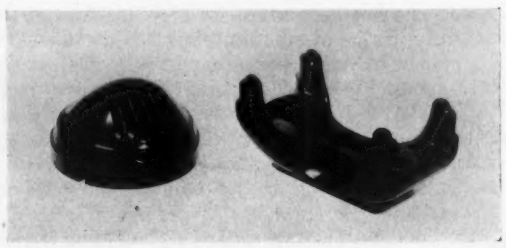
Under conditions of fluctuating humidity and water condensation, dimensional changes of the amino mouldings are not unduly large and in many applications are of no consequence whatsoever, e.g., moulded telephone handsets. On the other hand, there are instances where such instability is of greater moment and in which it can create maladjustment of electrical systems, e.g., spacer blocks for contracting springs. Weight and dimensional increases are appreciably greater than those exhibited by the common "phenol" wood flour filled mouldings. Under the severe conditions of water immersion for 21 days the amino plastic mouldings reveal an average increase in weight of 5.0 per cent., and dimensional increase from 1.0 per cent. to 3 per cent., according to the section of the moulding and which dimension is involved. Under test conditions more akin to severe service, as represented by the humidity test (daily cycles hot/cold, wet/dry, 8 hrs. 50/55 degrees C. and 70 per cent. humidity, 16 hrs. 18/22 degrees C. and 100 per cent. humidity), in a period of 21 days appreciable increases were still recorded, viz., 1.7 per cent. by weight, 0.6 per cent. increase in dimension being typical average values. Such conditions as portrayed by the humidity tests are encountered in telephone call boxes, private branch exchanges, traffic control and signalling systems, and in similar electrical installations in the many spheres where temperature and humidity conditioned atmospheres are not provided.

Exposure to moderate heat similarly promotes greater changes in amino-type mouldings than in the "phenol" variety. Again, the weight loss or contraction that occurs is of little significance in many common applications, but it can become a serious trouble if adjustments or clamping pressures are involved, and where precision of operation is an important feature of the apparatus. The maximum permissible exposure temperature is lower than for "phenol," these being of the order of 100 degrees C. and 135 degrees C. respectively, but long exposure of the amino plastics at 100 degrees C. may cause serious distortion or even blistering or splitting to occur. At the temperature of 70 degrees C., which well covers any reasonable service condition, in 21 days the average weight loss is of the order of 5.2 per cent. and the dimensional decrease 1.5 per cent. to 3 per cent. according to the section concerned.

A large number of amino plastic mouldings are used as stepped spacers, with the steps accurately machined, in connection with the disposition of springs in spring sets. The mouldings are employed in conjunction with the pile-up because it is not possible to control the limits of movement of the springs to sufficiently close accuracy from the clamped end, and the stepped spacers are positioned towards the contacting ends of the springs. It is found that if the normal moulded product is employed and the assembled product stored under dry conditions for any period, shrinkage occurs and spring adjustment becomes out of order. This is obvious when it is realized that 1.5 per cent. to 3.0 per cent. shrinkage means a decrease of 15 mm. to 30 mm. per inch. The difficulty can be obviated by applying a baking operation immediately prior to assembly, 72 hours at 90 degrees C. being a typical stabilizing treatment. However, it is stressed that the shrinkage and expansion characteristics with heat and humidity respectively are reversible, and therefore the so-called "stabilized" mouldings will still tend to expand if exposed to humid



Stepped insulators in white amino plastics.



Transmitter and cradle in red material.

conditions. Consequently mouldings subjected to the baking treatment can only be regarded as stabilized when called upon to operate in humidity-controlled atmospheres, and not for general "tropical" usage.

One photograph on the previous page shows several stepped insulators in white amino plastic.

As pointed out earlier, one of the outstanding advantages of the amino plastic mouldings is permanence of colour. This applies equally to the glass-clear, white and pastel shades in all colours. Colour and appearance are unaffected by moisture or moisture condensation, nor is the influence of heat up to 70 degrees C. detrimental. Exposure to light, natural or artificial, for extended periods likewise is not injurious.

Mechanical strength values are sound for the class of material, and are of similar order to those given for wood flour filled "phenol" resin mouldings, viz., tensile strength 1½ tons to 5 tons/sq. in., compressive strength 10 tons to 16 tons/sq. in., and impact strength of the order of 2 kgms./cm./cm³. They have been employed for mouldings subject to a considerable amount of shock, of which a typical instance is the telephone hand set in which the body, cradle, plunger and handle are all moulded; types of set in which the coloured forms have all been produced in amino plastics have been in service for many years.

The second photo shows transmitter cover and cradle moulded in various pale shades (e.g., ivory, green, red) of amino plastic.

Fabrication problems are no more arduous than with phenol aldehyde resin mouldings, and similar precautions have to be taken with respect to drilling and tapping.

Electrical properties are reliable, and design can assure adequate electric strength and insulation without difficulty. Electric strength at 20 degrees C. is 200/400 V.H.C. per mm., and at 90 degrees C. 150 V.A.C. to 300 V.A.C.; power factor at 800 cycles is 3/5 per cent. Insulation resistance is of high order even under humid conditions. In contrast to the phenol aldehyde resin products, the amino plastics are practically immune from the tendency to track under damp conditions.

The amino plastic mouldings are widely employed in the electrical industry and there are many applications in which they are indispensable on account of the two advantages stressed in the foregoing. Without the amino plastics, the thermo-hardening group would not be able to provide a material with these qualities, and recourse would have to be made to the thermo-setting materials, of which cellulose acetate is the most established member. These not only have a more severe restriction with respect to maximum allowable temperature in service, but also do not offer the same immunity from fire hazard as do the amino plastics.

HUNGARY'S LATEST EFFORT

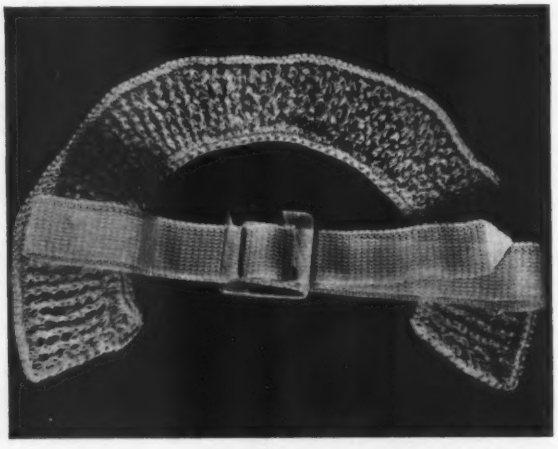
An excellent example of modern design moulded from phenol and urea materials, by Kabelgyar of Budapest. When closed there is no mistaking the purpose of the cabinet.

Ideas—

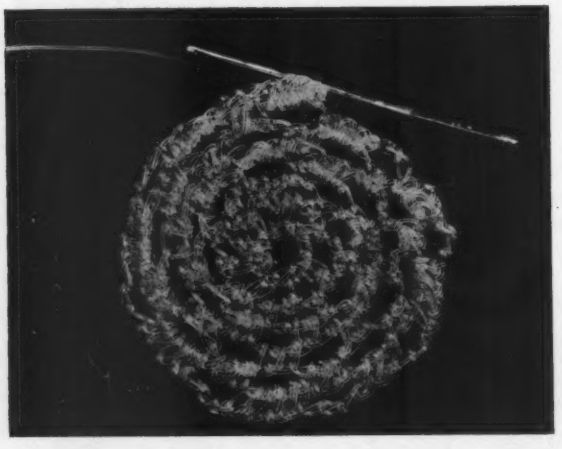
By the EDITOR

Plastic Thread

Last month I promised to show some examples of work carried out in cellulose acetate thread. I have now been able to get hold of some examples from May and Baker, Ltd., photographs herewith, of a belt and a collar which have been woven or crocheted from this material in France. I believe they were exhibited at the recent French exhibition. Since the thread can be obtained in any colours, transparent



or otherwise, many beautiful effects can be reproduced. The distaff side of my family is attempting that remarkable production of English life—a table-centre. Let us hope that enthusiasm will not run to socks or pullovers!



Since writing the above, the table-centre has advanced sufficiently rapidly for me to take a photograph of it. Not bad, but I think it could have looked neater if it had been done with thinner material instead of thread 40/1,000 in. Still, it does show that the stuff can be readily worked. The belt shown was done with much finer material. I should think that interesting play could be made of this thread for producing coloured woven "flowers."

Rubber Eraser

It would seem difficult to think of improvement in such a long-established object as a rubber eraser. One is apt to remark, "What is wrong with the existing type?" And yet, when one is told how it can be improved, one is bound to agree. Nevertheless, it is somewhat amusing to think that some inventor, somewhere, has worried over the problem. Anyhow, I hope he makes money out of his new idea, for he deserves it. He has made a rubber eraser that can be sharpened like a pencil with a penknife so that single letters can be rubbed out without touching the remainder of the word. It is being manufactured by the Blaisdell Pencil Co., of Philadelphia.

A New Art

I have just seen an example of a plastic moulding which has excited me more than anything else in the past year, and goes far beyond what I have urged in the way of artistic plaques. The photograph I publish here will prove that my excitement is not unnatural. Moulded from ivory-coloured amino resin, it is for all the world like a steel engraving of a Boucher

picture. It also possesses the beauty and texture of a finely etched plate. At present I have no details regarding its production, but I understand that a works for its development is being constructed in this country.

We have here a new art form with a vengeance, and since I have tried without any success to remove the picture by scrubbing with soap and water, I look forward with considerable pleasure to its wide introduction.

No Litter, Please

Evidently the London Transport Board are not quite sure what to use as a constructional material for making the used ticket boxes on the new buses, for I have seen three types, one in which the open slit is flush with the structure, one made of painted sheet steel and another made of steel covered with an imitation leather. The rapidity with which the appearance of these boxes deteriorates is very noticeable. The "leather"-covered one, in particular, becomes rapidly worn and even torn. There would appear to be here an excellent outlet for a moulded box or one built up from laminated sheet.

A Light on Night Life

A reader whose enthusiasm for luminous plastics is somewhat abnormal, has written suggesting the moulding in the new luminous material of a very long list of everyday products, from ladies' combs and other dress decorations for producing novel effects on the darkened dance floor, to odd implements for workers in the dark, like coal hewers and sewage cleaners. His sense of humour is also keen, for he suggests using the material to make luminous "keyholes" to help the wanderer home in the early hours, and luminous collar-studs which may be readily traced when they roll under the bed.

A NEW MATRIX MATERIAL

Interesting Application of Specially Developed Bakelite Product

PRINTING from rubber stereos has made great strides in recent years, and one of the factors which has made this progress possible is the development of a special Bakelite material for matrices. Not many years back rubber stereo printing could legitimately be regarded as synonymous with "hack" work—incapable of meeting the needs of those requiring clean print with long runs. To a large extent the printing of paper bags, pool coupons and similar jobs still provides the major portion of the rubber printer's activities, but the use of rubber stereos for periodical work is not improbable.

Papier mâché and similar types of flong suffer from a number of accepted disadvantages. It is not practicable to obtain a perfectly sharp impression, while the number of stereos which may be obtained from such an impression is very limited. The matrices produced from the Bakelite material reproduce every detail in the original, and it is, therefore, possible to obtain rubber stereos which are exact replicas of the original. Such stereos will be serviceable for much longer runs than those produced from a normal matrix, as many as 2¾ million copies having been printed from one rubber stereo.

The matrix material is produced by Bakelite, Ltd., in two grades, one of which is suitable for the reproduction of stereos or any solid master, and the other for the reproduction of type or a "set-up" of any description. The technical difference between the two is that the first-mentioned material flows very readily, and the material more suitable for type is of a fibrous nature, which prevents the material flowing down between the type.

Both grades of material are similar in that they incorporate a base of Bakelite resinoid, which possesses the property of becoming semi-fluid under the influence of heat and then, when heating is continued, assuming a permanently hard and solid form. The value of this property in a matrix material hardly needs stressing. In the fluid state it will faithfully register every feature of the master, permanently retaining this impression when rehardening occurs.

The technique in the production of Bakelite matrices is simple and inexpensive. The material is supplied in standard-size sheets, and may be sawn to any size or readily snapped after scratching with a sharp tool. A press, preferably hydraulic, is necessary having heated platens, the pressure required being about 250 lb. to 500 lb. per square inch at a temperature of 280 degrees Fahrenheit. From these figures it will be noted that the master is less liable to suffer damage in the production of a matrix by the new method than when a papier mâché flong is employed. The time which matrix and master must spend in the press is about 15 minutes, when the matrix is ready for use and will withstand the heat and pressure necessary for the production of rubber stereos from it without appreciable deterioration. These matrices have an exceptionally long life, and a large number of stereos can be made from each matrix.

The vulcanizing of the rubber takes a further 15 minutes, so that a complete rubber stereo ready for the press can be made from any master in approximately half an hour. At present this period is much too long for newspaper work, and a Bakelite material has yet to be developed which can be employed as a matrix for a type-metal stereo without damage. The possibilities of the material in the rubber printing field have, however, yet to be fully exploited before attention need be concentrated on its use in general newspaper work.

Examples of the new Bakelite matrices.

WHEN YOU EAT—

Do you realize that the most meticulous care is taken by food manufacturers to ensure the highest degree of purity and that one of the latest methods in use is to give all exposed metal parts of machinery and the interiors of large tanks a coating of a specially hardened synthetic resin?

BACKSTAGE at any food factory anywhere a constant war is being waged against the contamination of prepared foods, either by putrefactive organisms or the products of metallic corrosion. The high standards of purity now demanded for foods make it imperative to take advantage of all the help science can offer. One of the most successful methods of preventing the corrosion of metal plant is to line or coat it with a hard and durable synthetic resin, able to resist the attack of injurious chemicals and adhere tenaciously to the metal.

The many advantages of Lithcote, the non-vitreous baking enamel sponsored in America by the Lithgow Corporation, were described in *Plastics*, September, 1937, issue, but at that time the process was not available in this country and was only, therefore, of academic interest. To-day, however, a well-known Sheffield firm, Newton Chambers and Co., Ltd., specialists in the design, manufacture and installation of all kinds of cast iron, steel and other metal tanks, have become the sole British agents for the process, and are now in the position to give food manufacturers in this country the same Lithcote service as their colleagues in America have been receiving for the past five years or so.

Although originally developed for lining tanks, Lithcote has found many other uses. For instance, the catsup and sauce mixers in use at the works of Libby, McNeill and Libby are protected by means of this glass-like, non-chipping and sterile surface. American Molasses use it for lining their syrup boilers; the Blue Valley Creameries for their butter churns, and canning firms throughout the States for pea-grading machinery and boiling pans.

A feature about this new synthetic lining material is that it greatly facilitates cleaning and sterilization by reason of its exceptionally smooth, non-porous surface—usually only hot water and brush are needed for sterile cleaning, but steam sterilization may be employed if desired. Lithcote linings will not impart any trace of odour or taste to sensitive products whose purity must be unquestionable, and for this reason it is receiving premier consideration by sauce, flavour and patent-food manufacturers.

The enamel-like coating can be applied quickly and economically in situ and not only may new plant be treated, but also cast-iron sectional tanks that have become pitted and scaled. These can be safely and inexpensively reclaimed for many extra years of service by means of Lithcote.

Only a little thought and imagination are needed to visualize great possibilities for the Lithcote process in this country, where, during recent years, great progress has been made in our food industry, particularly as regards the canning of fresh vegetables and fruits.

Battery of milk pasteurizing vessels in use in a large dairy, all lined with Lithcote, which permits easy descaling.

PRODUCTION

Practical Information dealing with Raw Materials, Moulding and Forming of all types of Plastics—Thermo-Hardening and Thermo-Plastic—Works-Organization, New Plant and Control Apparatus

NOTES AND COMMENTS

Rubber Technology

THE first issue of the "Annual Report on the Progress of Rubber Technology," published by the Institution of the Rubber Industry, is to hand, and a fine first volume it is.

In general its purpose is to give information regarding the technical progress that has taken place in the past year, but so detailed is the information and so wide the scope that the volume is almost a complete text book in itself. Even more so, since each of the 24 sections listed is written and compiled by a well-known expert in that section. For example, we have the following:—

History, General and Miscellaneous, and Statistics. J. P. Griffiths, B.Sc., A.I.C., A.I.R.I.(Sc.).

Planting and Production of Raw Rubber and Latex, including Gutta-percha, Balata, Chicle and Jelutong, the Applications of these Products. Lt.-Col. B. J. Eaton, O.B.E., F.I.C., F.I.R.I.

The Properties, Applications and Utilization of Latex, including Treatment of Fabric with Latex. F. H. Cotton, M.Sc., A.I.C., A.I.R.I.(Sc.).

Chemistry and Physics of Raw Rubber, Gutta-percha, Chicle, Balata, Jelutong. C. A. Redfarn and P. Schidrowitz, Ph.D., F.I.R.I.

Synthetic Rubber. W. J. S. Naunton, Ph.D., M.A., A.Sc., F.I.C., F.I.R.I.

Testing Equipment, General and Specifications other than Latex. Geo. Martin, B.Sc., A.I.C., F.I.R.I.

Compounding Ingredients, General, Vulcanizing Accelerators, Antioxidants and Softeners. W. J. S. Naunton, Ph.D., M.A., M.Sc., F.I.C., F.I.R.I.

Fabrics and Textiles. W. Knight.

The Chemical and Physical Properties of Vulcanized Rubber. R. W. West, D.Sc., F.I.C.

Tyres. J. G. Mackay, Ph.D., B.Sc., A.I.C.

In addition, there are sections including belting, hose and tubing, cables and electrical insulation, footwear, toys, roads, flooring, surgical goods, sponge rubber and hard rubber, besides sections devoted to works processes in the factory and new machinery and appliances used in them. The price of the volume to members of the Institution is 5s. net and 10s. 6d. to non-members.

The Rise of the Plastics Industry

On June 20 Mr. Foster Sproxton, director and chief chemist of the British Xylonite Co., Ltd., delivered a lecture on the above subject before the Society of Chemical Industry at its annual meeting in Ottawa. The paper makes excellent reading, for not only does the author know his subject and the technique of producing and working most of them from celluloid, casein, to the more recent synthetic materials, but he can also write in a fascinating manner.

In virtue of his position, Mr. Sproxton's knowledge of celluloid production is profound, for British Xylonite were among the earliest producers. He tells of the discovery of nitrocellulose by Schönbein, who wrote to the great English chemist Faraday about it, and even suggested its use for making banknotes. In passing we wonder if this had any reference to the long-used expression "money to burn"!

Mr. Sproxton made reference to the early introduction of cellulose acetate, the non-inflammable "celluloid," and showed the great strides made in this material. Statistics of acetate made in this country are not available, but the growth in the U.S.A. is remarkable:—

100	tons	in	1931
2,400	,,	,,	1934
5,500	,,	,,	1935

He then dealt with thermo-setting resins of the phenol-formaldehyde type (Dr. Baekeland has recently estimated the value of the present output as £151,000,000 per annum) and the still newer urea-formaldehyde and the vinyl type of resin. Estimates of the production of Duprene (the synthetic-rubber material) for 1937 vary from 900 tons to 1,500 tons.

As for the future of plastics, said Mr. Sproxton, no one can foretell the course of future research. He ventured to prophesy that no single plastic would drive out all the others. Some of the present plastics may disappear, but in the future conditions in the plastics industry are likely to be very much the same as they are to-day, when several different kinds of plastics can co-exist because each of them meets some particular demand.

He also dealt with the problem of the replacement of natural materials by plastics. There is much to be said on each side of this question. In mechanism man appears to be beating Nature all along the line. The motorcar has superseded the horse, and the aeroplane

is far swifter than the bird. In chemical synthesis, however, Nature still holds some good cards. The chemist uses high pressures, high temperatures, strong alkalis, and strong acids to produce the materials from which his synthetic plastics are made. Nature, working within the range of a very few degrees centigrade and with no violent fluctuations in acidity, produces annually enormous tonnages of plastic bases. On the whole, plastics based on natural raw materials are more certain of their supplies.

On the other hand, the syntheses performed by Nature are not entirely uniform in quality. Nor, for that matter, are some of the syntheses performed by man, but we think it can be argued, from analogy with simpler syntheses, that the time will probably come when the molecular size and, perhaps more important still, the range of molecular size in a synthetic plastic raw material may be accurately controlled, and this may enable us to control the properties of the final plastic within closer limits than is now possible. We have good reason to predict that the chemist will eventually be the unchallenged master of the molecules.

Frequency-drift

Recent research undertaken by radio experts has shown that the use of synthetic resin insulating materials in super-heterodyne receivers for short-wave reception encourages an irritating fault known as frequency-drift, which in simple language really means a kind of dislocated reception during the first hour or so when the valves are warming up. Figures given by *Electronics*, November, 1937, are illustrative, and show the number of parts in a million by which the dielectric constant of several insulators vary per degree centigrade of temperature.

Varnish cambric	2,100
Synthetic resin	1,600
Insulation of ordinary "push-back" wire	1,500
Low-grade rubber covering on flex ...	1,100
Enamel insulation	470
High-grade rubber covering on flex ...	200
Ceramic insulators	100

The shortcomings of synthetic resin in this particular connection are well worthy of study, and we wonder ourselves whether a combination of rubber and resin might not be well worth trying out. Some time ago we encouraged one of our friends in the trade to experiment with mixtures of ground Thiokol and phenol-formaldehyde moulding powder for making certain small insulating devices, and we are awaiting the results with some impatience. Maybe this rather unorthodox moulding experiment will provide us with some interesting editorial copy.

Wood Plastics

The natural resources of Canada are so staggering as to be almost Munchausen, and if properly managed and exploited there need be no fear of a dearth of some of our most important raw materials. Take bitumen as an example. Although somehow Canada is not usually associated with this material there are vast quantities available in Northern Alberta, and Mr. G. S. Whitby, Director, Division of Chemistry, National Research Council, Ottawa, mentions in the June issue of *Canadian Chemistry and Process Industries* that the bituminous sands in that province are so extensive that they contain a quantity of bitumen variously estimated to be four to ten times the present known oil reserve in the world.

Another point stressed by Mr. Whitby is that the vast quantity of wood waste in the form of bark, slash, mill waste, sawdust, lignin, etc., which accompany the exploitation of the forests, is a formidable challenge to the chemists, which so far they have not taken up. To the best of our knowledge wood plastics have not received anywhere near the attention they deserve, although we understand that in America some progress has been made with Benaloid and Benalite, the all-wood plastics, which are made in thicknesses from .025 in. to 4 ins.

The cured sheet (Benalite) has a specific gravity of about 1.43, a modulus of rupture of 15,000 lb. to 20,000 lb. per square inch, a modulus of elasticity of 1,500,000 lb. per square inch or more, and a water absorption of about 0.6 per cent. in 24 hours, 0.9 per cent. in 48 hours, and 5.0 per cent. in one month. It may be turned, punched, tapped, sawn or drilled, and has wide possible application in the decorative panel field and elsewhere industrially.

Apart from lignin plastics as typified by Benalite, we should imagine that starting from mixtures of alpha-cellulose, beta-cellulose, lignin and the various pentosans and hexosans such as would be encountered in lumber waste, a crude all-wood plastic material could be made possessing likely constructional possibilities. We have recently heard of a new cellulose-albumen plastic available in sheet and powder form which originates from South America, and there is little doubt that there are other cellulose plastics in the making of which we know nothing. The potentialities of cellulose are so immense that there is still plenty of opportunity for research in this field. There is a definite market for strong and decorative plastic panelling in modern houses, particularly the all-wood dwellings which are rapidly returning to favour in this country. Already in Scotland 30 local authorities have sanctioned 2,700 wooden houses, and in England well-designed and sturdy bungalows and houses of Empire timber are becoming fairly common.

Impregnated Paper Containers

An apparently successful attempt is now being made in America to sell lubricating oil in cardboard containers. The containers in this case are made by a special process, details of which are not available, and they are guaranteed to be seep-proof and strong enough to withstand even abnormally heavy use. The outside of the new oil pack is protected by means of Bakelite varnish, and is stated to be completely water resistant. We ourselves have often wondered why resin-impregnated cardboard, similar to that used for radio transformers, is not used more extensively for packaging purposes. Technical difficulties do not appear to be unsurmountable, and there is apparently quite a healthy market for well-designed packs, which could be made to look very attractive when adorned with brightly coloured labels. Wax-impregnated paper containers have enjoyed a steady sale for some years now, and we should imagine that similar ones made of resin-impregnated material would be still more versatile in their applications. For specialized purposes amino-resin impregnated paper or cardboard would appear to be suitable, particularly in the case of foodstuffs, pharmaceutical and beauty preparations.

Inquiries and Answers

Container for Cosmetics

Niton, I.O.W.

To the Editor, *Plastics*.

Dear Sir,—The enclosed container was supplied to me by A.B.C. Plastic Moulded Products, of 61 and 63, Old Compton Street, W.1. I am proposing to use containers of this kind for the marketing of an eyelash grower in the shape of an ointment with a paraffin base. I should be very grateful indeed if you would give your opinion as to whether a container of this kind is suitable for such a purpose, or whether there is any likelihood of some ingredient of the container's composition affecting the ointment in any way to the danger of a user.

It is obviously to the advantage of the plastics industry that proper use be made of its products. I am, therefore, venturing to approach you in this matter.

As I have already taken steps to sell my preparation—it having only just occurred to me that any inquiry should first be made—I should be much in your debt if you could see your way clear to answer this letter at the earliest possible moment. A.A.M.

[EDITOR'S NOTE.—Without more information, we should say that the container you submit would be perfectly suitable, provided a reputable maker, such as those you have indicated, carried out the manufacture and produced properly cured mouldings.

In a well-produced container there would be no action at all between the paraffin base, by which I presume you mean petroleum jelly, and there would be no absorption by the petroleum jelly of anything of a deleterious nature.

We should, of course, have liked some further indication of the construction of your eyelash grower, but we expect you wish to retain this information as a secret.

Since, we presume, that it is not at all alkaline nor strongly acidic in nature, attack by these is out of the question. We think you can pursue your marketing without any fear. Some years ago there was some trepidation over the use of phenol-formaldehyde resins for perfumes. This can be quite understood as these are of such a delicate nature. However, we understand that even this problem has been solved satisfactorily.]

Natural v. Artificial Wool

Reading.

The Editor, *Plastics*.

Dear Sir,—May I put a question which is probably outside the province of *Plastics?* Will artificial silk ever be made as warm as wool and what is the difference between the two materials that makes wool so warm?

L.P.P.

[EDITOR'S NOTE.—This interesting problem is well within our province. Artificial silk or Rayon will probably never be as " warm " as wool, for the reason that Rayon is a synthetic material totally different in structure from the natural wool. It is chemically different, but of far greater importance is the general structure of the wool fibre and the structure of the wool or Keratin molecule itself. Wool possesses an amazing elasticity because of the arrangement of its atoms—it may resemble a spiral or some such form —and also possesses a cross linked system of these molecules which help the wool to retain air within them. This problem was admirably discussed by Sir Frank Smith in a recent issue of the *Manchester Guardian Commercial:*—

" The warmth of a textile material as an article of clothing involves physical factors which are important in studying the special characteristics of wool. While Keratin itself is known to be a better thermal insulator than cellulosic materials, it is found that the thermal resistance of a fabric is mainly determined by its structure. The best thermal insulator in a fabric is the air which may be locked up in its interstices, and it is here that the wool fibre has an advantage over others. By virtue of its power of felting, light and porous fabrics can be constructed in which the included air is finely and evenly distributed. Moreover, the elastic properties of the wool fibres ensure that the porous structure will be preserved when compressed even in a wet condition. The power of felting is intimately connected with the microscopic structure of the fibre. The saw-toothed scales of the natural fibre, coupled with the power of elastic recovery when wet, provide a kind of ratchet and pawl mechanism by which an irreversible interlacement of the fibres can be produced in the milling process. Even if artificial fibres could be provided with these sharp saw-toothed profiles, it would still be necessary that they should possess the elastic properties of the wool fibre if effective competition with it as a source of material for warm clothing is to be established."]

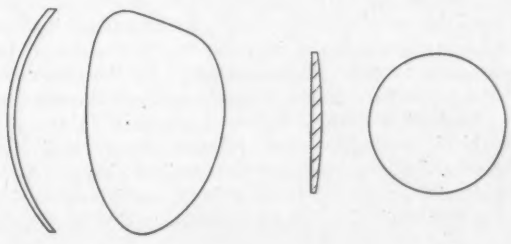
Moulds for Lenses

Brooklyn, N.Y.

The Editor, *Plastics*.

Dear Sir,—We are interested in obtaining the names and addresses of firms who manufacture grinding and polishing machinery for polishing hard steel dies that would require a mirror or lens finish. We are moulding lenses of a plastic material and while we have a large machine shop and could build the machines ourselves, we would have to start from scratch, so we would prefer to buy some machines.

There are two different types of lenses that we manufacture, one is a round lens 2 ins. in diameter about $\frac{1}{8}$ in. thick. This has a flat surface on the bottom and a curved surface on the top. The other one has a curved surface on both sides, shaped like the sketch enclosed. We would not want the lenses polished. We would want the forcers that are in the dies, which are made of hard steel, ground and polished. The upper and lower forcers in each die, one would produce the lower part



of the lens and the other would produce the upper part of the lens, are what we want to polish.

If you can give us the names and addresses of any firm who make these polishing machines we would highly appreciate your courtesy.

INSULATION MFG. CO., INC.

[Will fabricators of such fine work please communicate with this office?]

Transparent Switch Covers

London, W.1.

The Editor, *Plastics*.

Dear Sir,—We would be pleased to learn whether you know of a suitable transparent material for moulding switch covers. We would also be obliged if you could put us in touch with moulders of such a product.

D.E. COMPANY.

[EDITOR'S NOTE.—Transparent moulded switch covers have already been made of the new transparent Beetle. Inquiries should be made to British Industrial Plastics, Ltd., 1, Argyll Street, London, W.C.2. An associate company, Streetly Manufacturing Co., Ltd., are also moulders. Inquiries might also be made of Mouldrite, Ltd., 2, Buckingham Gate, London, S.W.1, who produce Diakon transparent moulding powders.]

Cast Resins

Liverpool.

To the Editor, *Plastics*.

Dear Sir,—Can you please advise me if there is a preparation available for the following purpose, and, if so, from whom this may be obtained? Plastic preparation suitable for casting, the finished article to be used for machining, i.e., drilling and tapping. The preparation to be made suitable for pouring by either heat treatment or by chemical means. The finished item to be permanent with reference to temperatures up to, say, 200 degrees C. The mould to be prepared from plaster, using hand-shaped wood patterns.

I have in mind the making of a limited quantity of sample items for test purposes before commitments are incurred with respect to the usual tools for mass production from moulding powders.

Your advice on this point would be greatly appreciated. J.F.M.

[EDITOR'S NOTE.—The only plastic preparation that seems at all fitted for the purpose is the cast phenolic type, plaster-of-Paris, wax preparations and so on being quite unable to withstand the temperature and amenable to drilling or tapping.

Cast resins are admirably suitable, but the disadvantage is that any casting would have to be carried out in works that produce the resin. We consider that it would be reasonable to ask such a factory to co-operate with the inquirer, who, if possible, could send the wood pattern or the plaster mould to them. The raw resin could then be run in and cured into the solid form (it takes some days for the completion of the process), under properly controlled conditions.

The alternative is to buy cast resin in the solid cubical, cylindrical or tubular form, and then mechanically to cut out the desired shape. As we indicated in our last issue, at least one firm is employing this method of making samples prior to carrying out the mass production of moulded goods from moulding powders.

The following firms might be approached to assist:—

Catalin, Ltd., 3, Vere Street, London, W.1.
Erinoid, Ltd., Lightpill Mills, Stroud, Gloucester.
Mouldrite, Ltd., Nobel House, Buckingham Gate, London, S.W.1.
Permastic, Ltd., Woodham Works, New Haw, Weybridge, Surrey.]

Nomenclature of Plastics

Birmingham.

To the Editor, *Plastics*.

Dear Sir,—I have a suggestion to make re the nomenclature of the various plastics. Could not the whole of the plastic materials on the market be tabulated, with their trade and chemical names, also their properties? This would greatly assist users of plastic materials in choosing suitable materials for their particular jobs. Whether this has already been done I do not know. The metal trade has had a similar handbook for years. At the moment one appears to be at the mercy of the salesman with the most plausible tongue. I feel sure there would be quite a demand for a handbook published on the above lines. L.C.H.

[EDITOR'S NOTE.—We thoroughly agree that such a book is necessary to the industry. There is none in existence at present. There is hope, however, that it will be produced at some future date, as the outlines are already in form and in the possession of a well-known plastics consultant. As the number of plastics are increasing so rapidly and their characteristics improving, one of the suggestions is to produce the book in loose-leaf form, so that additions can be readily made.]

Impregnating Metal Castings

Newcastle.

The Editor, *Plastics*.

Dear Sir,—As you probably know, many metal castings are porous. Is it possible to lower the porosity by treatment with a synthetic resin? There are many instances in metallurgy where the finished goods are not subjected to high temperature and where porosity is a great drawback.

[EDITOR'S NOTE.—Almost at the same time as the above inquiry arrived a note came from General Plastics Inc., New York, giving details of a new development for this purpose. The company has produced Durez 278 expressly formulated for the elimination of blowholes and porosity in metal castings. In the communication from General Plastics Inc., the letter concludes with: "As you are probably aware, the casting manufacturer is reluctant to say that his casting may be porous, but will readily admit that the density is often greater at the surface than within. Consequently, when any amount of machining is necessary for finishing, and such machined surface is subjected to pressure, there is often a slight seepage, which would necessitate recasting the piece. On large castings this would, indeed, be very costly. The synthetic-resin solution Durex 278 has been found to be more generally satisfactory than other types of material heretofore commonly used, because of the inherent resistant qualities of the resin."]

TRADE AND PERSONAL NOTES

Thomas De La Rue and Co., Ltd., have declared a profit for the year ended March 31, 1938, at £185,000, compared with £51,000 previously. The dividend on the £310,000 of capital is raised from 8 per cent. to 12 per cent. and, in addition, it is proposed to distribute a capital bonus of 10 per cent. The 8 per cent. dividend last time took £24,800, and £31,700 was placed to reserve.

Siemens Bros. and Co. made a trading profit, 1937, of £256,777, after providing all expenses, working and management, and crediting investment income and dividends from subsidiary companies.

The British Rubber Publicity Association (Incorporated in England) has now taken over propaganda and publicity for rubber products previously handled by the Rubber Growers' Association. The address of the new body is 19, Fenchurch Street, London, E.C.3.

Two new directors of **Imperial Chemical Industries** are Sir John Anderson, K.C., late Governor of Bengal, and Mr. Peter F. Bennett, chairman of Joseph Lucas and president of the Federation of British Industries.

We have just received a most interesting little booklet entitled "Safeguarding your Property," by **Foamite, Ltd.,** Marlborough Street, W.1, which describes very fully the eight standard Foamite appliances and also the Alfite carbon dioxide appliances.

Hercules Powder reports for the first quarter net earnings of $656,027 after providing for depreciation and Federal taxes. This compares unfavourably with net earnings of $1,475,590 for the first quarter of 1937.

Announcement of a new division to handle the sale of rubber-like materials and synthetics, to be headed by Dr. H. E. Fritz, has been made by W. S. Richardson, mechanical rubber merchandising manager of **B. F. Goodrich,** Akron, Ohio.

Yorkshire Dyeware and Chemical Co., Ltd.—A final dividend of 11¼ per cent., making 16¼ per cent. for the year, less tax.

Power Alcohol is shortly to be produced in Northern Ireland on a considerable scale. The erection of the plant will start almost immediately, and it is expected that production will begin in 12 months' time, about 300 men being employed. It is expected that a cheap and plentiful supply of alcohol will encourage other industries in Northern Ireland, and two well-known plastics firms are interested in sites outside Belfast. Alcohol plays a considerable part in the manufacture of certain thermo-plastics.

British Xylonite Co., Ltd., have just issued a new catalogue of articles manufactured from Xylonite and other plastics manufactured by the company. It consists of 133 pages of well-illustrated and displayed matter, and all the articles and materials are carefully indexed to make references both quick and accurate. In the introduction, the company stress the fact that not only the goods mentioned in the catalogue, but the Xylonite materials themselves, are made entirely in England in their own factories by highly skilled craftsmen. The British Xylonite Co., Ltd., are in the unique position of being the only manufacturers of celluloid articles in Great Britain who can make such claims.

Standard for Industrial Circuit-breakers.—The B.S. Specification for Oil-immersed Switches and Circuit-breakers has recently been revised, and published as B.S.116-1937. In the Foreword to the revised edition it is stated that, pending the issue of a British Standard Specification for Industrial Circuit-breakers, B.S.116-1929 may be applied to such circuit-breakers for specified voltages and breaking capacities. Consequently the 1929 edition of B.S. 116 is still current for this class of circuit-breaker. Would-be purchasers may have been disappointed to find that the 1929 edition was out of print. A reprint has, however, now been made and copies of B.S. 116-1929 are now available from the Publications Department of the British Standards Institution, 28, Victoria Street, London, S.W.1, price 5s. per copy.

The agreement for the assignment of the "Lanital" patent by **Snia Viscosa and Comm. A. Ferretti** to **Messrs. Yoshio Kodama and Kasado,** representative of the well-known Mori industrial group in Tokio, was signed in Milan a short time ago. The assignment covers Japanese and Manchukuo territory and entails the erection of a large factory in Japan before the end of the year for the manufacture of synthetic wool.

Pitman's Handbook of Commercial and Technical Education, London, price 15s., is a valuable reference book which has just been published. It is a directory of the organizations in this country which conduct courses or examinations in commercial and technical education; it gives details of the examinations, fees, etc.

Alfred Herbert, Ltd., Coventry, have sent us the May-June issue of "Machine-Tool Review," which is exceedingly interesting and contains several articles on machine-tool practice of real service to practical moulders and fabricators. We recommend the article on page 91 dealing with "Segments and Segmental Wheels" as likely to prove of considerable interest to mould makers and engineers in general.

Mr. H. V. Potter, B.Sc., F.I.C., M.I.Chem.E., managing director of Bakelite, Ltd., has been nominated vice-president of the Society of Chemical Industry. He is now on his way back from Canada after attending the Canadian Chemical Congress.

Owing to the expansion of their business, **Phipps Signs** have had to take larger premises and, on account of its convenient situation, have moved to West Bromwich. Also, in order to conform more with the nature of their manufactures, there has been a change of name to **Phipps Plastic Products, Ltd.,** Dome Works, 244, Bromford Lane, West Bromwich, Staffs.

Work has begun on the erection at St. Helen's Auckland of a factory for the **Bond Moulding and Engraving Co., Ltd.** The site of the factory has been acquired by the Commissioner for the Special Areas in England and Wales. The land is being leased to North-Eastern Trading Estates, Ltd., who are also carrying out the construction of the factories. The Bond Moulding and Engraving Co.'s factory will give employment initially to about 50 workpeople. It will manufacture name plates, instruction plates, instrument dials, and plastic mouldings.

Mr. E. A. Sealby, of Bromley, Kent, has applied for the Council's consent to the establishment of a special industrial business, viz., the manufacture of synthetic resin, at the Creamery, Buxted.

The directors of **Redfern's Rubber Works, Ltd.,** of Hyde, Cheshire, are to pay one week's wages at the standard rate for the "Wakes" holiday week to all wage-earning employees who have been in the company's service for the previous 12 months. In the case of those who have entered the company's employ since the first week in September, 1937, a payment of 1-50th of the standard weekly wage for each week worked will be paid.

The Soviet Government intends to intensify considerably its production of synthetic rubber. The output of motorcars in Russia amounted to 200,000 in 1937, and at present averages approximately 750 to 800 a day. Chemically produced rubber is to play a most important part in the production of all tyres.

D

NEW MATERIALS—NEW PLANT—NEW METHODS

NEW CONTINENTAL BAND FILER

A new low-priced filing machine that files continuously through the use of a band of files is now on the market. It is known as the "Continental Band Filer" and is illustrated below. The manufacturer is Continental Machines, Inc., of Minneapolis, U.S.A.

The machine has an upper and lower wheel pulley which carries the file band, similar to band saw construction. The file band is a Swedish flexible spring steel band on which are riveted short segments of files. The band flexes over the pulleys while the segments open up and stay straight. The file band forms a continuous flow of a rigid column of filing surface at the point of work.

The file bands are furnished in various standard cuts and shapes of files; ⅜-in. wide bands and also ½-in. wide bands are available in all of these various shapes. There is also a vixen cut which has very large milled teeth and acts like a milling cutter or broaching cutter more than a file in dressing brass, aluminium, copper, zinc, etc. The great assortment of files available permits use of the machine on all the metals, from the toughest high-

The new band filer is simple and accurate to operate.

carbon steel to aluminium. Files are also available for working on such materials as plastics, fibre, wood, etc. There is a narrow support behind the files at the point of work so that great pressure can be exerted for filing rapidly.

The initial cost of the file bands is low. They are said to last two or three times longer than conventional files. There are several basic advantages to this tool over hand filing or reciprocating filing machines. The band cuts in one direction, thus eliminating the back stroke, which often dulls files. In filing by hand, there is always the return stroke, which is a dead cycle. The back stroke will dull the teeth of the file unless hand filing is done with great skill. Only through long practice with even pressure can hand filing be done so that the files stand up and cutting is done with skilful dexterity.

With this "New" machine there is a steady pressure of cutting, and even cutting increases the life of files. An unskilled operator using this machine can equal the results of the most expert hand filer. With the steady pressure of cutting that is possible with continuous filing, exceedingly skilful finishes can be obtained which enhance the appearances of the finished articles to a considerable extent.

All of the file surface that is purchased is used up and not merely an area in the centre, as in the case of ordinary files. Since the band of files flows over the work continuously, there is no part of the file used any more than another part.

The file is operated at the correct surface speed for each job, thus increasing file life. Great pressure can be exerted so that heavy cutting on a wide area can be done.

The machine will file an absolutely straight and smooth material up to 5½ ins. thick.

This new machine has a 12-in. work table which tilts in two directions so that work may be filed at an angle. The machine is designed as a bench model, so that each workman in a shop may have one on or near his bench, or it also may be picked up and moved easily. It may also be put on a stand or base which the manufacturer has available. The height overall is 32 ins. Shipping weight is approximately 150 lb.

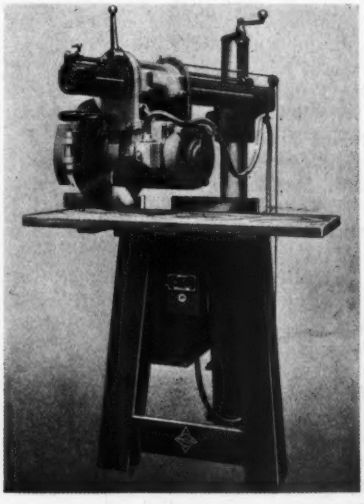
Clean line design is obtained by employing the housing as the frame of the machine to completely contain the working parts. The upper wheel has a 2-in. up and down adjustment and convenient hand wheel to facilitate fast changing of bands.

The "Continental Band Filer" machine has a gear reduction transmission running in oil. The machine is operated by any ¼ h.p. motor.

Precision Cutting Machines

The latest brochure dealing with precision metal-cutting machines has just been published by the Midland Saw and Tool Co., Ltd., Birmingham, and deals with a number of new machines. Dimensions and specifications are given for the Midsaw die-cutting bandsaw for steel, non-ferrous and all sheet metals, and also for the Midsaw cut-off machine and high-speed edge miller. A good point stressed throughout this book is that rapid, clean and accurate cutting are assured only if the right type of blade is used, and the speed and construction of the machine are scientifically correct for the particular type of metal to be handled.

Of special interest to the plastics industry are the Midsaw cut-off machine and high-speed edge miller.



The Midsaw cut-off machine as used in the plastics industry.

The former is illustrated and shows the saw carried on the motor shaft in line with the centre of the post, thus giving maximum length of cut at all angles.

The machine is normally supplied with an oak table and this can be moved forward so that full advantage may be taken of the length of cut for varying thicknesses of material. Two cast-iron adjustable fences are fitted at the back of the table and can be arranged to support the material near the saw wherever the saw may be operating. These fences are provided with means for carrying a fitment controlling the length.

Automatic Process Control

Bristol's system of co-ordinated process control makes it possible to place even the most intricate scientific process under complete automatic control, and thereby facilitate production and ensure a uniform product.

This control system is for industrial processes that are developed and perfected in the laboratory and pilot plant, and depend for their success on rigid control of such factors as the time of operation of valves (all sizes up to large gate valves), pumps, blowers, dampers, etc., and the control, at a definite value or according to a time programme, of such variables as temperature, pressure, liquid level, flow, humidity and speed. Of extreme flexibility, it is applicable in an almost infinite variety of combinations to a great diversity of processes and industries.

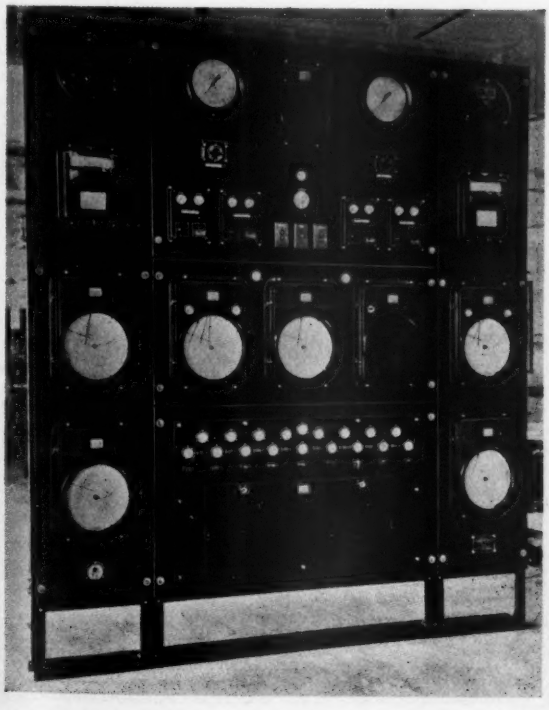
The co-ordinated process control system can be applied to any plant process for which the exact schedule of operation for best over-all results is known—processes which depend upon close control for product quality —processes that give trouble, because their schedule of operation is such that operators find it difficult to follow them manually.

The exact "formula," sequence of operation, or control point of each factor affecting product quality, cost and yield that is recommended by the designer of a process, can be built into the co-ordinated control system. It carries out each step and controls each factor with split-degree accuracy. With it practically any laboratory process or formula can be put into automatic production on a full-scale basis without deviation from the original plan and without chances for error.

Bristol's unique system is an automatic machine built in the form of a master control station. It provides a scheme of interlocking each of the vital events of a process, so that they take place in successive steps and proceed only after the previous function has been concluded. The system consists of recording and controlling instruments built around the so-called "mechanical brain." Each system is designed and engineered for the particular process on which it is used. The instruments are standard instruments selected for their ability to perform a given duty in co-operation with each of the other instruments of the system.

In the American plastics industry, Bristol's system has found important application. Here it involves a panel of control instruments which co-ordinate all of the critical and essential operations in a process plant. In these plants all of the functions normally left to manual control are synchronized and interlocked by the co-ordinated process control system. The refinement of the control equipment and the precision of operation almost completely eliminate the necessity of technical supervision.

Bristol's Instrument Co., Ltd., North Circular Road, London, are the manufacturers of this most ingenious time and labour-saving system, which is attracting the attention of many important industrialists in this country.



A master control station installed in a plastics factory in America.

New Steel Barrel Containers

National Steel Barrel, 3850 E. 91st Street, Cleveland, O., have introduced a line of 5-gallon pails equipped with the company's easy-to-open, tight-sealing, Quik-Lox Rings that offer many advantages to shippers of solid, semi-solid and liquid materials and to their customers. New pails are easy to fill as the ring permits the head to be removed exposing the entire interior of the pail to the view of the operator, eliminating exact spotting for filling, and reducing the likelihood of spillage to a minimum.

After filling, the gasket-lined heads are replaced and the pails prepared for shipment by simply closing the quick-acting lever-like ring, thereby lowering the cost of this operation and speeding it up. Provision is made for wire sealing to insure tamper-proof delivery in the event of this being desirable. Also, the fully removable heads may be fitted with pull spouts, etc., as needed.

M.C.L. and Repetition, Ltd., have just issued a novel booklet which describes in a most amusing manner their various quality repetition products made from bar in all metals. The illustrations throughout the book consist of a selection of animals made up entirely of bolts, screws and other parts.

High-vacuum Pumps

The Stokes high-vacuum pump was developed to meet the need for a simply designed high-efficiency pump that would give reliable low-cost service under severe operating conditions. Outstanding features of the Stokes high-vacuum pump are the built-in oil clarifier, the remarkable simplicity of the entire mechanism, its heavy, sturdy construction, high mechanical efficiency and low power requirement. An important feature of the machine is that there is no dead space or "clearance"; discharge of air at the end of each stroke is complete and no re-expansion impairs pump efficiency. Vacuum can be produced and maintained within a few microns of absolute. The pump comprises three internal moving parts only:—(1) the shaft with its keyed-on eccentric, (2) the rotating plunger, and (3) the valve slide. All these parts are accurately finished, fit snugly in the pump cylinder and between the two heads and are accessible without disturbing pipe assembly. Full particulars of the Stokes pumps in the form of a most attractively produced brochure may be obtained on request from W. Edwards and Co., Allendale Works, Vaughan Road, Loughborough Junction, London, S.E.5, and we strongly recommend all those interested to obtain a copy.

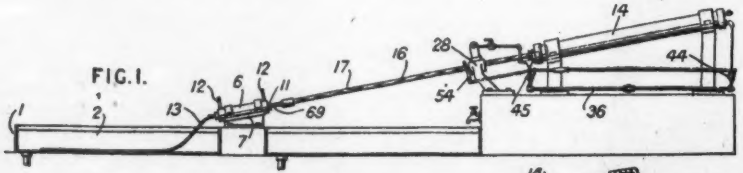
PATENTS RELATING TO PLASTICS

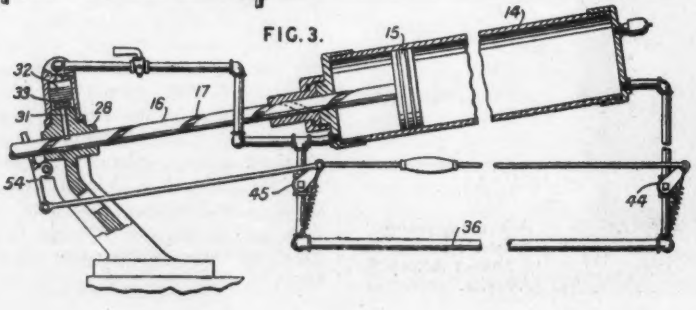
These abridgments of recently published specifications are specially compiled for this journal by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet, as issued, on payment of 5s. per group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address, price 1s. each.

480,989. Moulding Tubes from Thermoplastic Material

CELLULOID CORPORATION. January 8, 1937.

A suitable machine for making the tubes from thermoplastic material is shown in Figs. 1 and 3 and comprises a number of formers 6, to which strips 13 of the material are fed from a tank 1 containing heated liquid 2, and rods 16 for drawing the strips through the formers. Each rod is provided at one end with a coupling 69 for insertion through a hole in a strip 13 and is rotatably connected at the other end to a piston 15 adapted to reciprocate in a cylinder 14; the rod 16 is also provided with a helical groove 17 for engagement by a pin, etc., 31 located in a bearing 28 through which the rod passes, the pin 31 being integral with a plug 32 and normally held out of engagement with the groove 17 by a spring 33. The piston 15 is actuated by compressed air, etc., which is supplied to the cylinder 14 from a pipe 36 through a valve 45, this causing the rod 16 to be moved to the right to draw the strip; simultaneously air is supplied to the plug 32 to cause the pin 31 to engage the groove 17 and effect rotation of the said rod. At the end of the stroke the rod coupling 69 actuates a lever 54, which opens the valve 45 to exhaust and opens a valve 44 to pressure air, to effect the return of the piston and withdrawal of the pin 31. Each former comprises an outer jacket which surrounds a metal forming tube 11 flared at both ends and is provided with cold water inlet and outlet pipes 12, and all the formers are mounted on a support 7.





479,202. Artificial Threads

JOHNSON, G. W. (I. G. Farbenindustrie Akt.-Ges.). August 5, 1936, No. 21566. [Class 2 (ii).]

Artificial threads are obtained by splitting, e.g. by twisting, brushing, or rubbing, films, bands, tubes, or threads of an organic thermo-plastic material, which are strongly orientated parallel to their length. Suitable thermo-plastic materials are polymerized vinyl chloride, polymerized styrene, polymerized vinyl esters, polymerized acrylic compounds, polymerized vinyl carbazole.

480,627. Removing Moulds from Castings, etc.

KAPPELER, H., MANGOLD, R., and NOLL, K. January 7, 1937.

In making prosthetic parts such as in dentistry, of metal, rubber or synthetic resin, in a mould, for example of plaster or phosphates, the mould is removed by treating with a disintegrating liquid which renders the mould friable. The liquid may produce chemical changes in the material or generate gas or heat. Several such liquids may be used in succession. Alcohols, aldehydes, ketones, acids, alkalies, oxides, or peroxides or solutions or mixtures thereof may be used. The mould may be preheated or heat may be applied during the treatment which may be carried out under vacuum. In examples, alcohol, acetone, hydrogen peroxide, formaldehyde, ammonia, caustic soda, soda followed by hydrochloric acid, formic acid followed by ammonia, and sulphuric acid are used for plaster moulds.

481,316. Sponge or Cellular Rubber.

INTERNATIONAL LATEX PROCESSES, LTD., WARD, A. N., and PURKIS, F. T. December 21, 1936.

Goods of sponge-like or cellular structure are made from foamed aqueous dispersions of rubber or the like containing an oxide of lower solubility of a metal of fixed valency of Group II of the Periodic Scheme, e.g. oxide of calcium, magnesium or zinc, by bringing about the solidification of the foam in the presence of aqueous solutions of ammonium salts conditioned to have a pH greater than 7. Suitable ammonium salts are ammonium sulphate, nitrate and acetate. Usually it is sufficient to make the solution of the ammonium salts just alkaline to give an alkaline reaction with such an indicator as Bromo-Thymol Blue. When heat is used to effect the solidification it should not be above the boiling point of water.

480,347. Compound Fabrics

TEXTIL - AUSRUSTUNGS - GES. May 15, 1936.

Two layers of fabric are united locally or over their whole area by an adhesive, e.g. a cellulose ester or ether or a resinous polymerization product, special effects being obtainable by the use of fabrics shrinking to different degrees during the subsequent finishing operations. In an example, a viscose georgette fabric is coated with an adhesive and a viscose dull crêpe fabric is pressed upon the coating by a cylinder with a raised pattern.

479,217. Polyvinyl Ethers

JOHNSON, G. W. (I. G. Farbenindustrie Akt.-Ges.). October 14, 1936.

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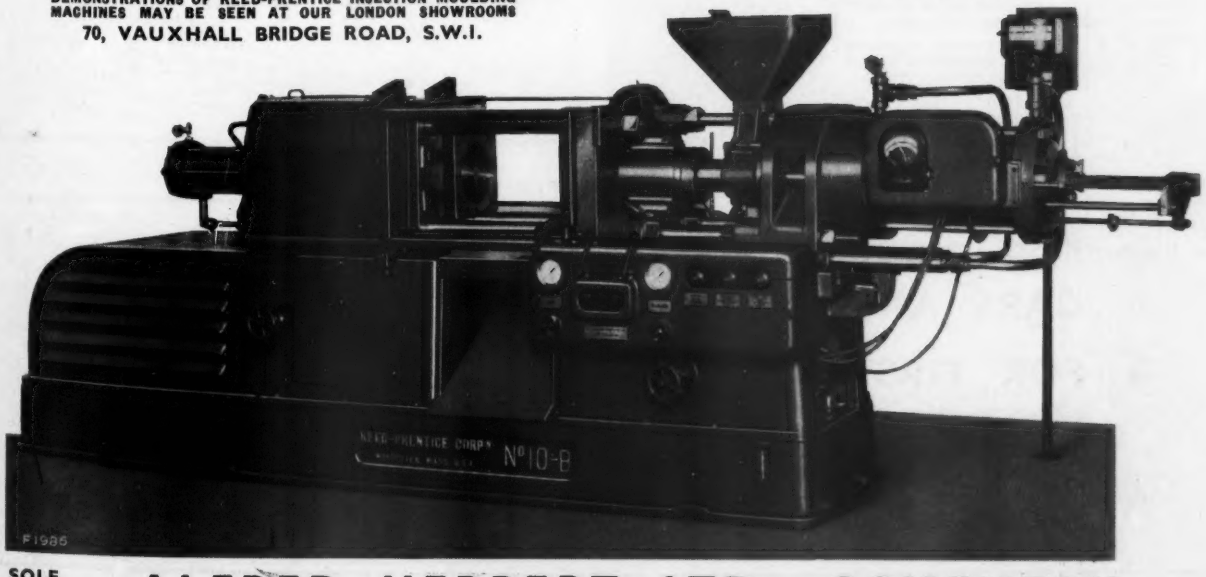

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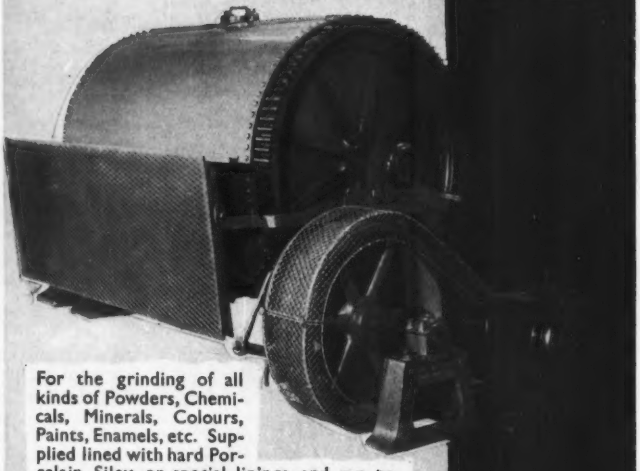

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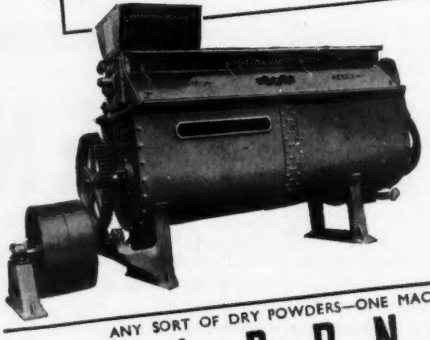

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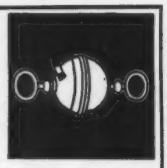

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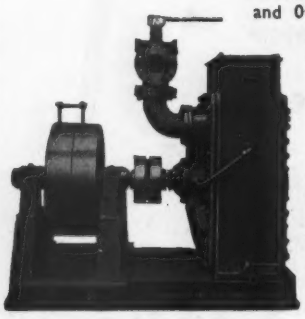

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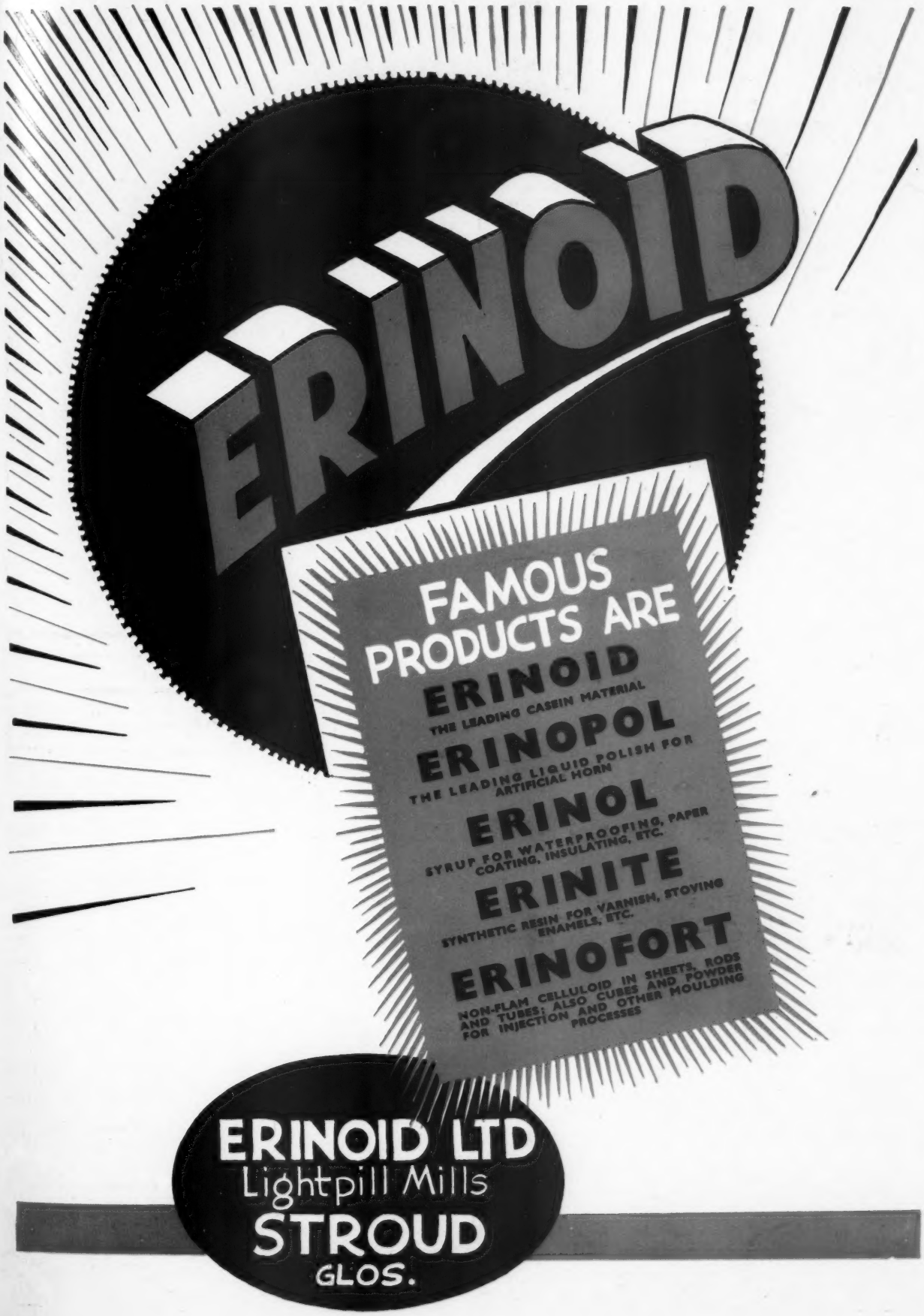
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